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ROYAL BOTANIC GARDENS, KEW.

BULLETIN
OF
MISCELLANEOUS INFORMATION.

No. 1] [1924

I. MATERIALS FOR A FLORA OF BRITISH HONDURAS: I.

T. A. Sprague and L. A. M. Riley.

The Colony of British Honduras is situated on the eastern slope of Central America, approximately between the parallels of 15° 54′ and 18° 29′ north and 88° 10′ and 89° 9′ west. It is bounded on the north by the Mexican State of Yucatan, on the west and south by the Republic of Guatemala, and on the east by the Caribbean Sea. Its area is 7562 square miles, the seaboard being about 180 miles [over 200 miles, according to W. R. Dunlop] in length, and the average depth from the coast-line to the western frontier being 40–50 miles. British Honduras is thus slightly larger than Wales, nearly twice the size of Jamaica, and more than four times as large as Trinidad. The population in 1921 was estimated at 45,317 persons, mostly Spanish-American, coloured, or black.

"Although the colony is in the tropics, its climate is subtropical. The highest shade temperature recorded is 98° F., the lowest 50°. Easterly sea-winds prevail during the greater part of the year. The dry season lasts from the middle of February to the middle of May; rain occurs at intervals during the other months, and almost continuously in October, November and December. The annual rainfall averages about 81½ in., but rises in some districts to 150 in. or more."* "The average rainfall at various points is approximately as follows:—Corosal 50 inches; El Cayo 55 inches; Belize 60 inches; Stann Creek (Town) 90 inches; Punta Gorda 150 inches."† "The mean temperature of Belize in 1888 was 80°, the maximum 92°, and the minimum 58°, giving a range of 34° . . . . The mean relative humidity is 74° . . . . Beginning in the morning with 93° or 100°, at mid-day it is only 64° to 62°, giving a range of 38°."*

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* Encycl. Brit. ed. 11, iv. 615 (1910).

† W. R. Dunlop, Report on the Economic and Natural Features of British Honduras, 2 (1921).

The part of British Honduras bounded on the south by the Northern River "is a dead flat, with the exception of a few small hillocks or ridges and some shallow basins with a very gentle incline from the western frontier to the sea—a plain of about 1000 square miles. There are several lagoons, but comparatively few swamps. The soil is a vegetable mould (humus), some 12 or 18 inches deep, the subsoil being a stony marl . . . . That portion of the colony lying between the Hondo and a line drawn from Belize to Indian Church embraces a region the formation of which consists of thin surface-soil—the decayed droppings of trees—over a subsoil of indurated marl. The uplands are so far interior that very little of their débris reaches this district, unlike the southern, in which the surface soil is alluvial from the greater contiguity of the high lands. At Indian Church the limestone crops up, and beyond the Hondo the Yucatecan Hills arise. To the west, about Booth's River, the Bravo, and Blue Creek (tributaries of the Hondo), the marl has a top soil of blue clay under the surface soil. The absence of alluvium and detritus in the northern district is manifestly owing to the slower currents of the rivers."†

"The southern half of the colony presents a totally different aspect from the northern. Towards the western, and particularly the south-western boundary, the region develops table-land and plateaux. The range of mountains beginning at Sibun and running nearly parallel to the coast, are clothed with verdure to their summits, but at right angles to these are others veiled in mist, rising behind, higher and higher, in amphitheatrical form, whose conical peaks proclaim their volcanic birth. The highest peak in the Cockscomb Mountains, now known as the Victoria Peak, is 3700 ft. above the level of the sea."† The region between Garbutt's Falls on the Belize River, at the western frontier, and the sea-coast at Deep River was traversed in 1879 by the Colonial Secretary, Mr. Fowler. "The country proved to be a succession of valleys and hills, from 1200 to 3000 feet above sea-level. The westerly portion was an open undulating grassy country, forming magnificent pasturage lands. Towards the coast it was all forest, which was full of valuable timber."†

The salient features of the country have been summarized as follows:—"In the north the surface is generally level with wet to swampy soil in places and periodically dry conditions in others; in the former the prevalent formation is clayey disintegrated limestone, in the latter (which include the so-called "pine-ridges") almost pure sand overlying Tertiary sandstone. Southwards the country becomes gradually hilly (the hills consisting of metamorphosed sandstone), and south of Deep River there are folded calcareous sandstones, giving rise to fertile rolling country with obvious potentialities for agriculture. The best and most accessible lands lie along the rivers, which flow through deposits of alluvium but are separated by sandy ridges. The northern rivers are generally slow and deep with fairly direct courses, the southern fast-flowing, winding, and shallow."* For a detailed account of the geology etc. of Northern Central America the reader should refer to Sapper's paper in *Petermanns Mittheilungen*, Ergänzungsheft No. 127 (1899).

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* Bristowe and Wright, Handbook of British Honduras for 1889–90, 230 (1889).

† Bristowe and Wright, *op. cit.* 16–17.

Our knowledge of the vegetation of British Honduras is due mainly to the investigations of Sir D. Morris, who paid a short visit to the colony at the close of the year 1882, and embodied his results in "The Colony of British Honduras, its Resources and Prospects," London, 1883—a work now unfortunately out of print. Much additional information is contained in Mr. E. D. M. Hooper's "Report upon the Forests of Honduras" (1887), and Mr. W. R. Dunlop's "Report on the Economic and Natural Features of British Honduras" (1921). According to these authors there are four main types of country, namely mangrove swamps, cohune-ridge, broken-ridge, and pine-ridge. Dunlop mentions the existence of coastal savannahs associated with the mangrove-swamps. Speaking generally, cohune-ridge, broken-ridge and pine-ridge occur as parallel tracts in between the rivers in the following order: river, cohune-ridge, broken-ridge, pine-ridge, broken-ridge, cohune-ridge, river. Hooper states that it is considered that one-third of the country is pine-ridge and two-fifths cohune-ridge, and less than a quarter broken-ridge and coast-swamps, but adds that in his opinion broken-ridge and swamps occupy more than a quarter of the whole area.

TYPES OF VEGETATION.

Mangrove swamps.—The low coast-line and the numerous cays or coral islands are covered with a dense and almost continuous growth of mangrove trees, which give the country, as seen from the sea, a densely wooded appearance. For a few miles inland the country is low and swampy, with numerous lagoons. The principal trees in the mangrove swamps are Red Mangrove (*Rhizophora Mangle*), Black Mangrove (*Avicennia nitida*) and White Mangrove (*Laguncularia racemosa*). Sapodilla (*Achras Sapota*) and Seaside Grape (*Coccoloba uvifera*) occur on drier elevations. Mahoe (*Paritium tiliaceum*) grows in marshes near the sea, and Buttonwood (*Conocarpus erectus*) is common in swampy places. The Manchineel (*Hippomane Mancinella*) is confined to dry ridges near the sea-shore, and is by no means a common tree.

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* Geogr. Journ. 1922, lix. 473 (Review of Mr. W. R. Dunlop's Report on British Honduras).

No detailed account of the Mangrove-swamps of British Honduras has been published. According to Harshberger* the plants of the Mangrove formation of Central America are essentially the same as in Mexico. A sketch of the sea-coast flora of Tabasco was published by Rovirosa in La Naturaleza, and reproduced in Ramirez, La Vegetación de México, 110, 111 (1899). The characteristic species are *Rhizophora Mangle*, *Okenia hypogaea*, *Chrysobalanus Icaco*, *Coccoloba uvifera*, *Ipomoea pes-caprae*, *Scirpus maritimus*, *Avicennia tomentosa* and *Paritium tiliaceum*; at a short distance are extensive woods largely composed of *Pimenta officinalis* var. *Tabasco* and *Crescentia cucurbitina*. By the sides of lagoons and swamps are trees of *Lonchocarpus hondurensis*, *Haematoxylon campechianum* and *Inga spuria*; among the frutescent and herbaceous plants in the same situation are *Dalbergia campechiana*, *Clerodendron ligustrinum*, *Cassia bicapsularis*, *Malvaviscus arboreus*, *Jacquinia racemosa*, *Paullinia barbadensis*, *Corynostylis Hybanthus*, and *Gynerium saccharoides*. When the lagoons dry up, their beds become covered with herbaceous plants including *Eragrostis reptans*, *Parthenium Hysterophorus*, *Helenium quadridentatum*, *Egletes viscosa*, *Hydrolea spinosa* and *Cardiospermum Halicacabum*. Among the more or less submerged aquatic plants are *Vallisneria spiralis*, *Cabomba aquatica*, *Ceratophyllum demersum*, *Potamogeton fluitans*, *Heteranthera graminea*, *Limnanthemum Humboldtianum*, *Eichornia azurea* and *Nymphaea ampla*. The floating species include *Pistia Stratiotes*, *Jussieua natans*, *Neptunia oleracea*, *Typha angustifolia*, and the vascular cryptogams *Acrostichum aureum*, *Ceratopteris thalictroides* and *Azolla caroliniana*. These sometimes travel freely before the wind and sometimes occur in association with *Thalia geniculata*, *Ipomoea fistulosa*, *Cyperus articulatus* and *Arundo domingensis*. On alluvial ground the characteristic species are *Pithecolobium ligustrinum*, *Buettneria carthaginensis*, *Muntingia Calabura*, *Sapindus marginatus*, *Trophis mexicana*, *Brosimum Alicastrum*, *Terminalia Buceras* and several species of *Ocotea*.

The littoral flora of Panama appears to be similar, according to Seemann† and Wagner.‡ *Rhizophora*, *Avicennia*, and *Acrostichum aureum* are the principal elements in the vegetation of the mangrove swamps. On the sand of the sea-beach *Ipomoea pes-caprae* grows in wild luxuriance, producing runners often more than 200 feet long. Higher up, where the ground is firmer, are groves of coco-nut palms, Manzanilla trees (*Hippomane Mancinella*), and spiny *Prosopis* and *Cereus Pitajaya*, or thickets of *Crescentia cucurbitina* and *Paritium tiliaceum*.

Schimper§ states that the Western Mangrove formation (found on the West African and American coasts) contains four species

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[*] Harshberger, Phytogeographic Survey of North America, 664 (1911).
[†] Bot. Herald, 65, 66 (1852).
[‡] Petermann, Geogr. Mittheil. 1863, 280–299.
[§] Plant Geography, Engl. ed., 406 (1903).

only: *Rhizophora Mangle, Laguncularia racemosa, Avicennia tomentosa* and *A. nitida. Rhizophora Mangle* occupies the outer edge of the formation, whilst *Laguncularia racemosa* appears particularly at the inner boundary, and there frequently forms pure mangrove. The *Avicenniae* assume an intermediate position.

In view of the great extent of the Mangrove formation in British Honduras its study on ecological lines should prove interesting. It may be expected to exhibit the same general features as have been observed in Tabasco to the north, and Panama to the south.

Coastal Savannahs.—According to Dunlop, the coarse grasses which cover these savannahs have not been identified. Sabal palms (*Sabal excelsa*?) and Calabash trees (*Crescentia Cujete*) occur in places. Further information is desired as to the vegetation of the coastal savannahs, and as to whether they may not be of artificial origin. Morris mentions that "the pastures, commons, or fields, in the neighbourhood of settlements, are easily formed after the forest is cut down by the natural grasses of the country. Chief amongst these is *Paspalum distichum*, a wide-spreading broad-leaved grass, which forms a close turf much liked by cattle." Morris also mentions that "often the belt of intermediate low growth between the coast and the virgin forests is termed broken-ridge; but in this case it is one that has been artificially formed by abandoned cultivated areas, and does not occur under the conditions which obtain in the natural state."

Cohune-ridge.—"The term cohune-ridge (Spanish *corozal*) is applied to the low-lying lands generally bordering river valleys, or occupying extensive tracts or basins, as in the west and south, or at the heads of some of the river-systems. Geologically speaking a 'cohune-ridge' has been formed by a river-valley, or depression in the quartzy ground-floor of the country, being, in process of time, filled up by large deposits of fine alluvium and vegetable débris brought down from the interior by means of rivers. Hence a cohune-ridge is deep, rich, and very abundantly supplied with nitrogenous compounds, affording splendid food for plants."

"As its name indicates, a cohune-ridge has as its characteristic plant, the noble cohune-palm (*Attalea Cohune*), which in different stages of its growth, forms probably 20, and in some cases, 30 per cent. of the vegetation, the remainder being composed either of mahogany [*Swietenia macrophylla*], cedar [*Cedrela mexicana*], rosewood [*Dalbergia*], sapodilla [*Achras Sapota*], Santa Maria [*Calophyllum*], the smaller palms, or shade-loving trees . . . The 'give-and-take' (*Acanthothrinax*) is chiefly a cohune-ridge palm; it is so abundantly covered with long compound spines, about 3 to 4 inches long, that it is a very formidable object . . . The silver-thatch (*Thrinax argentea*), big-thatch (*Sabal mexicana*) and the monkey-tail (*Euterpe edulis*) grow in cool moist situations under the shade of tall timber-trees . . . Of the small palms belonging to the genera

Chamaedorea and *Geonoma* there are numerous species, forming a large percentage of the undergrowth. *Chamaedorea Ernesti-Augusti*, with its partially pinnate fronds and simple unbranched spadix, is often not more than 3 feet high when in fruit. Other species are *C. elegans*, *C. humilis*, *C. desmoncoides* and *C. graminifolia*."

Two species of *Castilloa* occur in British Honduras (*C. elastica* and *C. Tunu*). These are found in most of the cohune-ridges, but are daily becoming scarcer in the immediate neighbourhood of settlements.

The composition of the cohune-forest evidently varies. The forest between Seven Hills and the Toledo Settlement is "composed of valuable timber trees such as mahogany, axemaster, rosewood, augusta, salmwood, sapodilla, etc., with numerous palms. The cohune-palm forms about ten per cent. of the forest growth. The ground generally in the more open parts was carpeted with selaginellas, ferns, and shade-loving grasses. Under dense shade the undergrowth was very slight." Elsewhere aroids form part of the ground vegetation or, along with orchids, hang in festoons from the trees.

Among additional trees of this association mentioned by Hooper are Braziletto, Yemeri, Mylady, Palmaletto, Ziricote, Ironwood (*Laplacea*), Pigeonwood, Candlewood, Poisonwood, Bullhoof, Halfcrown, Billywebb, Dogwood (*Piscidia*), and Fiddlewood (*Citharexylon*); the undergrowth is extremely varied and includes *Melastomaceae*, *Piperaceae*, *Bromeliaceae*, *Zamia*, Bamboos, and several species of *Vanilla* and *Smilax*.

According to Dunlop, large areas of cohune-ridge have been exploited for the purposes of agriculture, and are now covered with secondary forest or bush, of which the Trumpet tree (*Cecropia*) is a common constituent.

Broken-ridge.—The broken-ridge is intermediate in character between the cohune-ridge and pine-ridge. The soil is more argillaceous than that of the cohune-ridge, and is often waterlogged. The trees are smaller, the undergrowth denser and more scrubby in character, and the vegetation as a whole is poorer and less luxuriant. It includes the gru-gru palm (*Acrocomia sclerocarpa*), Sabal palms, rosewood (*Dalbergia*), logwood, sapodilla, spiny shrubs of *Randia*, *Capparis*, cockspur (*Acacia spadicigera*) and several other *Leguminosae*. The more open spaces, clothed with rank grasses, coarse bromeliads and prickly creepers, form a transition to the pine-ridge country. Logwood and sapodilla are characteristic of the swamp country, which occurs more particularly on the north-east coast.

Pine-ridge.—"Where the original quartzy rocks, in the form of a bold conglomerate, gravel or fine sand derived from the central zone, appear on the surface they give rise to extensive tracts of undulating or comparatively level country, known locally as 'pine-ridges,' so-called from the prevalence upon them of trees of the yellow pine [*Pinus caribaea*]."

"These tracts, as may be expected, possess a shallow poor soil, and they are covered only by hardy coarse grasses. The pines are dotted over the country in small clumps or singly, giving it an open park-like appearance. Associated with the clumps of pine-trees is a small slender fan-leaved palm known locally as pimento thatch." Other common pine-ridge plants in the south are the crabboe, a small shrubby tree yielding a kind of plum or cherry, and the haha, a wild fig, whose leaves are used as sandpaper. Amongst the hard coarse grass of the pine-ridge small low-spreading shrubs are found, such as *Pithecolobium ligustrinum* and *Cassia diphylla*; a few ground orchids (*Habenaria* and *Stenorrhynchus*) and small yellow-flowered hypoxids. According to Dunlop, the carpet of grasses on the Great Southern pine-ridge is largely composed of *Leptocoryphium lanatum* and *Axonopus laxiflorus*.

To the west the ordinary pine-ridge plants give place to groves of oak (*Quercus virens*). Hooper states that this oak, which is associated with the pine-trees in the interior hills at high elevation, monopolises the ground in the depressions of the ridges, which are everywhere undulating. Besides the oak there is an occasional undergrowth of straggling Acacias, Coco-plum, groups of Palmetto (*Chamaerops tomentosa*), *Thrinax*, Sabal, and *Acrocomia*, while in the creeks dividing the ridges occur *Podocarpus*, *Selaginella arborea*, *Pitcairnia* and *Clusia*.

According to Hooper, in some localities *Pinus caribaea* forms a pure association. On the Great Southern pine-ridge he counted 101 trees to the acre, and at All Pines 245 trees.

BOTANICAL EXPLORATION.

The flora is perhaps less known than that of any other British Colony. Prior to 1883 there were probably not more than twenty dried plants from British Honduras in the Kew Herbarium. About fifty or sixty more were received from Mr. [now Sir] D. Morris and Mr. E. D. M. Hooper during the period 1883–1886. Sir A. Moloney sent 65 specimens to Kew in 1894, and about 200 were received in small instalments from Mr. E. J. F. Campbell, Curator of the Botanic Gardens, Belize, during 1898–1911. About 50 herbarium specimens principally of trees were received during 1920–1921 from Mr. C. Hummel, Conservator of Forests, British Honduras: some of these proved to be new, *e.g.*, *Vochysia hondurensis*, *Rinorea Hummelii* and *Belotia Campbellii*.

Professor Morton E. Peck visited British Honduras during 1905–07 and formed a collection of about 1,000 numbers of dried plants, the first set of which appears to be at the Gray Herbarium. No complete enumeration of the collection has been published, but an account of the *Gramineae* was given by F. T. Hubbard in the Proceedings of the American Academy, xlix. 493–502 (1913), and numerous new Dicotyledons have been described by S. F. Blake in Contributions from the Gray Herbarium, n.s. lii. 59–106 (1917). One of the later sets was acquired for the Kew

Herbarium; the specimens are numbered, but are without collector's labels, so that localities cannot be given except in the case of those species mentioned by Hubbard and Blake.

A set of 194 dried plants from the Colony collected by the Rev. J. Robertson in 1889–90 was purchased by the British Museum (Natural History) in 1890; as far as possible these have been included in the present enumeration.

The total number of Phanerogams in British Honduras may be estimated at not less than 4,000 species. There are about 2,800 in Jamaica, which has an area of 4,200 square miles. British Honduras on account of its continental position and much larger area may be expected to contain half as many again. Our enumeration which is based on the material in the Kew Herbarium and the British Museum, and on records from all sources, will probably not include more than 800 species. As pointed out in *Kew Bulletin* 1905, p. 43, the Colony still remains botanically a *terra incognita*. Before a comprehensive flora can be prepared organised exploration by experienced systematic botanists is necessary.

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Swayne, Sir E. British Honduras (Geogr. Journ. l. 161–179; 1917).

Dunlop, W. R. Report on the economic and natural features of British Honduras (London, Crown Agents for the Colonies, 1921).

[In order to economise space the following abbreviations have been adopted: BW., Bristowe and Wright, Handbook of British Honduras for 1889–90; CNH., Contributions from the United States National Herbarium; H., Hooper, Report upon the forests of Honduras; M., Morris, The Colony of British Honduras; PAA., Proceedings of the American Academy.]

RANUNCULACEAE.

Clematis dioica *L.;* CNH. xxiii. 267.
Peck 736.

Differs from typical *C. dioica* from the West Indies in the coarsely serrate leaflets.

DILLENIACEAE.

Davilla Kunthii *A. St.-Hil.;* Triana et Planch. Prodr. 18.
Peck 322.

Curatella americana *L.*
All Pines, fl. April, *Robertson* 193; *Campbell* 30; *Peck* 689.

Leaf used as a substitute for sand-paper by the natives of the interior (Campbell).

Doliocarpus pubens *Mart.;* Triana et Planch. Prodr. 17.
Peck 270.

ANONACEAE.

Guatteria diospyroides *Baill.* in Adansonia, viii. 269 (1868).
Peck 583.

Petioles shorter and leaves relatively broader than the single authenticated specimen in the Kew Herbarium.

Cymbopetalum penduliflorum (*Dunal*) *Baill.* in Adansonia, viii. 268 (1868); CNH. xxiii. 279.—*Unona penduliflora* Dunal. Monogr. Anon. 100; t. 28 (1817).
Peck 891.

Anona glabra *L.;* CNH. xviii. 14. *A. palustris* L.; M. 86; Fawcett and Rendle, Fl. Jam. iii. 197.

Vernacular names "Corkwood", "Alligator apple".

The wood is used for lining boxes, stopping bottles, etc. The fruit is narcotic and probably poisonous (Morris).

A. involucrata *Baill.* in Adansonia, viii. 265 (1868); CNH. xviii. 32.—*A. Prestoei* Hemsl. in Hook. Ic. Pl. tt. 2519, 2520 (1897).
Cayo village, *Campbell* 113.
Vernacular name " Tooky ".
The fruits are eaten.

Xylopia frutescens *Aubl.* Hist. i. 602, t. 242 (1775): Triana et Planch. Prodr. 39.
Campbell 6.
Vernacular name " Pole wood ".

MENISPERMACEAE.

Cissampelos Pareira *L.;* Diels in Engl. Pflanzenr. Menisperm. 286.
Stann Creek, fl. April, *Robertson* 175; *Peck* 274.

C. tropaeolifolia *DC.;* Diels, l.c. 299.
Peck 602.

NYMPHAEACEAE.

Nymphaea ampla (*Salisb.*) *DC.;* Conard, Waterlilies, 134 (1905).—*Castalia ampla* Salisb.
Peck 469.

N. ampla var. **pulchella** (*DC.*) *Casp.;* Conard, l.c. 136.
Belize, in mangrove swamps, *Robertson* 20.

Robertson's specimen was named var. *pulchella* by Conard (Mus. Brit.) but was cited by him under typical *N. ampla* (l.c. 135).

CAPPARIDACEAE.

Cleome spinosa *Jacq.;* Fawcett and Rendle, Fl. Jam. iii. 225.
Belize, in house gardens, *Robertson* 4.

Capparis sp.; M. 64.
A small-leaved spiny shrub growing on broken-ridge (Morris).

Herbarium specimens are desired in order to identify the species.

CISTACEAE.

Lechea tripetala (*Moc. et Sessé*) *Britton* in Bull. Torr. Bot. Cl. 1894, xxi. 252; Engl. Pflanzenr. Cistac. 139.—*L. Skinneri* Benth. (1844). *Helianthemum tripetalum* Moc. et Sessé ex Dunal (1824); Ic. Ined. t. 47.
Peck 143.

VIOLACEAE.

Rinorea Hummelii *Sprague* in Kew. Bull. 1921, 307.
Salt Creek, *Hummel* 11; Hillbank, *Hummel; Hooper.*

SAUVAGESIACEAE.

Sauvagesia erecta *L.*
Stann Creek, fl. March, *Robertson* 141; *Peck* 55.

BIXACEAE.

Cochlospermum vitifolium *Willd.*—*C. hibiscoides* Benth. *Maximiliania vitifolia* Krug et Urb.; Blake in Journ. Wash. Acad. Sc. xi. 128 (1921).

Stann Creek, fl. March, *Robertson* 122; *Campbell; Peck* 686.

Bixa Orellana *L.;* M. 85.

Vernacular name " Anatto ".

POLYGALACEAE.

Polygala adenophora *DC.;* Chodat, Monogr. ii. 178, t. xxi. fig. 33–34.

Peck 133.

P. asperuloides *H.B.K.;* Blake in Contr. Gray Herb. n.s. xlvii. 84.

Wet pine-ridge near Manatee Lagoon, *Peck* 234.

P. hygrophila *H.B.K.;* Chodat, l.c. 161, t. xxi. fig. 11–12; Blake l.c. 89.

Peck 908.

P. longicaulis *H.B.K.;* Chodat, l.c. 182, t. xxii. fig. 1–3; Blake l.c. 93.

Low pine-ridge near Manatee Lagoon, *Peck* 132.

P. paniculata *L.;* Chodat, l.c. 229, t. xxiv. fig. 10–11; Blake l.c. 99.

Open ground near Manatee Lagoon, *Peck* 242; *Campbell* 32.

P. variabilis *H.B.K.;* Chodat, l.c. 180, t. xxi. fig. 35–36; Blake l.c. 95.

Open ground near Manatee Lagoon, *Peck* 147; Stann Creek, *Robertson* 194.

Bredemeyera lucida (*Benth.*) *A. W. Benn.* in Mart. Fl. Bras. xiii. pars 3, 51 (1874).—*Catocoma lucida* Benth. in Hook. Journ. Bot. 1842, iv. 101; Griseb. Fl. B.W.I. 29.

Peck 336.

Better material is desired in order to confirm the identification. The species was previously known from British Guiana and Trinidad, and, according to Bennett, from Brazil.

Securidaca erecta *Jacq.;* Fawcett and Rendle, Fl. Jam. iv. 246.

Campbell 17.

VOCHYSIACEAE.

Vochysia hondurensis *Sprague* in Kew Bull. 1922, 183.

Campbell 19; Punta Gorda, *Hummel* 6; *Peck* 912.

Vernacular names " Yemeri ", " Red Yemeri ".

A large tree yielding a good wood for boards, and used extensively for making small boats.

CARYOPHYLLACEAE.

Drymaria cordata *Willd.*; Fawcett and Rendle, Fl. Jam. iii. 175, fig. 67.

Belize town, fl. Dec., *Robertson* 26; *Peck* 519.

PORTULACACEAE.

Portulaca oleracea *L.*

Melinda, a weed, *Robertson* 215.

P. pilosa *L.*

Stann Creek, a common annual in gardens, fr. April, *Robertson* 209; *Peck* 475.

HYPERICACEAE.

Hypericum terrae-firmae *Sprague et Riley*, sp. nov.; affine *H. styphelioidi* A. Rich., a quo foliis longioribus pro rata angustioribus subtus haud punctatis, sepalis lanceolatis distinguitur.

Caules pluries furcati, 3 mm. diametro 3·5 dm. infra apices ramulorum, parte foliata 6–7 cm. longa, cicatrices foliorum circumscriptione sursum late rotundatae, medio leviter emarginatae, deorsum bisinuatae, id est, medio convexae et utrinque concavae, lateribus deorsum cuspidatae. *Folia* sessilia, oblongo-lanceolata, 1·5–2·5 cm. longa, 3·5–4·5 mm. lata, apice acuta, in basin latum a medio angustata, supra leviter concava marginibus cartilagineis, basi quinquinervia superne trinervia, glandulis elevato-punctatis, subtus pruinosa costa prominente nervis quam supra minus obviis, glandulis haud elevatis itaque inconspicuis. *Flores* in apicibus ramulorum solitarii, sessiles, foliis circumdati. *Sepala* lanceolata, sensim in apicem angustata, 1·1 cm. longa, 3 mm. lata, circiter 10-nervia nervis instar striarum, coriacea, glabra, eglandulosa. *Petala* circiter 2·3 cm. longa, 6 mm. lata, multinervia. *Stamina* numerosissima, circiter 1 cm. longa. *Ovarium* ellipsoideum, 3 mm. longum, 2·5 mm. diametro, glabrum, uniloculare, multiovulatum. *Styli* 5, 5 mm. longi, basi in tubum 0·5 mm. longum coaliti; stigmata capitata. *Capsula* 5 mm. longa, 4 mm. diametro, sepalis petalisque persistentibus tecta. *Semina* cylindrica, leviter curvata, 1 mm. longa, vix ultra 0·25 mm. diametro, punctato-striata.

British Honduras, *Peck* 321 (type in Herb. Kew); *Hooper*.

The representative on the mainland of the Cuban *H. styphelioides*. In *H. terrae-firmae* and *H. styphelioides* the leaves disarticulate at the base, whereas in *H. caracasanum*, *H. pimeleoides* and *H. Mutisianum* they break off above the basal portion, which remains attached to the stem. Keller appears to have overlooked the existence of *H. pimeleoides*, and to have redescribed it as a new variety, *H. caracasanum* var. *ocanense* (Bull. Herb. Boiss. sér. 2, viii. 183; 1908).

Vismia Camparaguey *Sprague et Riley*, sp. nov.; cum *V. ferruginea* H.B.K. olim confusum, foliis longioribus lanceolatis basi nunquam acutis sed contra aliquando subcordatis, sepalis post anthesin haud reflexis diversa.

Caules compressi, sulcati, 3 mm. lati 3 dm. infra apicem, ferrugineo-tomentosi, internodiis 5–5·7 cm. longis. *Folia* lanceolata, acuminata, basi rotundata vel subcordata, 11–18 cm. longa, 5·8–6·5 cm. lata, coriacea, utrinsecus 15–16-nervia, supra glabra, subtus laxe ferrugineo-tomentella; petioli 1–1·7 cm. longi. *Thyrsi* terminales, circiter 8·5 cm. longi, 6–6·5 cm. lati, multiflori; bracteae 1 mm. longae; pedicelli sulcati, 5–8 mm. longi. *Sepala* aestivatione quincuncialia, ovato-lanceolata, obtusa, 6·5 mm. longa, 3–3·5 mm. lata, crassa, extus ferrugineo-tomentosa, intus glabra, basi 1 mm. connata; interiora marginibus membranaceis 0·5 mm. latis. *Petala* oblanceolata, apice obtusa, in basin sensim angustata, 7 mm. longa, 3 mm. lata, multinervia, extus glabra, intus villosa. *Squamae* 1 mm. longae, 0·75 mm. latae, villosae. *Staminum phalanges* polyandrae, 5·5–6 mm. longae, villosae, versus basin glabrescentes. *Ovarium* ovoideum, 2·5 mm. longum, 2 mm. diametro, glabrum, loculis multiovulatis. *Styli* 5, 3 mm. longi, glabri; stigmata peltata. *Bacca* ovoidea, 1·1 cm. longa, 9 mm. diametro, glabra, stylis coronata, inferne sepalis persistentibus tecta.—*V. ferruginea* Donnell Smith Enum. Pl. Guat. vi. 3 (1903), non H.B.K.

Central America: Guatemala; Alta Verapaz, Cubilquitz, 350 m., *Tuerckheim in Donnell Smith* 7825 (type in Herb. Kew). British Honduras, *Peck* 878.

Vernacular name " Camparaguey ".

V. macrophylla *H.B.K.* Nov. Gen. v. 184 (1822); Triana et Planch. Prodr. 304.

Peck 941.

V. macrophylla was discovered by Humboldt and Bonpland by the river Cassiquiare in Venezuela. According to the original description the young branchlets are glabrous, and the leaves are 6 in. long and 3 in. broad. Triana and Planchon (l.c.) identified *V. macrophylla* with a Colombian and Central American species which has tomentose branchlets, and leaves about three times as long as their breadth. They stated that the type specimen in Bonpland's herbarium was so imperfect as to render comparison difficult. Although there is some doubt as to the correctness of their identification, it seems desirable to accept it until better material has been obtained from the original locality.

GUTTIFERAE.

Clusia sp.; H. 6.

In the creeks dividing the pine-ridges (Hooper).

Herbarium specimens are desired in order to determine the species.

Symphonia globulifera *L. f.;* M. 85.
Near Regalia Estate, *Morris;* Manatee, *Hummel* 19.

Rheedia sp.
Macaroni Hill, *Campbell* 94.

A tree, fruit eaten as "Waika plum" (Campbell). The herbarium specimens consist of branchlets bearing leaves and numerous axillary fascicles of male flowers. These have two sepals, four petals in two whorls, and about 11–17 stamens surrounding a rugose rudiment of an ovary. Specimens bearing female flowers and fruits are desired, as the species appears to be hitherto undescribed.

Calophyllum Calaba *Jacq.;* M. 62; BW. 199; H. 32.
Vernacular name "Santa Maria".
Used for various purposes including Mahogany trucks.

Calophyllum sp.
Mullins River, *F. Arnold.*
Vernacular name "Santa Maria".

Probably an undescribed species. Specimens bearing flowers and fruits are desired.

Mammea americana *L.;* H. 32.

"A tall tree 80 ft. high, 30 inches diameter, giving a handsome wood" (Hooper).

Vernacular name "Mammee Apple".

MARCGRAVIACEAE.

Marcgravia nepenthoides *Seem.* in Journ. Bot. 1870, 245; Hemsl. Biol. Centr.-Amer., Bot. i. 90, t. 6.
Peck 822.
Previously known from Nicaragua only.

THEACEAE.

Ternstroemia sp.
Peck 470.
Material insufficient to determine the species with certainty.

Laplacea haematoxylon (*Swartz*) *Camb.;* M. 62; BW. 201.—*Gordonia haematoxylon* Swartz.
Vernacular name "Ironwood".

The record requires confirmation. *L. haematoxylon* is a native of Jamaica. Possibly some other theaceous tree may have been mistaken for it in British Honduras.

MALVACEAE.

Sida acuta *Burm.;* E. G. Baker in Journ. Bot. 1892, 238.
Mullins River, *Robertson* 38; *Peck* 155.

S. althaeifolia *Swartz*—*S. cordifolia* E. G. Baker, l.c. 291, partim, non L.
Stann Creek, fl. Jan., *Robertson* 43.

S. ciliaris *L.*; E. G. Baker, l.c. 141.
Peck 175, 452.

S. dumosa *Swartz;* E. G. Baker, l.c. 296.
Hooper.

S. linifolia *Juss.;* E. G. Baker, l.c. 140.
Peck 243.

S. paniculata *L.;* E. G. Baker, l.c. 294.
Peck 618.

Wissadula excelsior *Presl*; R. E. Fries in Svensk. Vet.-Akad. Handl. n.s. xliii. no. 4, 44 (1908).
Stann Creek, fr. March, *Robertson* 130; *Peck* 266.

Malachra alceifolia *Jacq.*; Gürke in Engl. Jahrb. xvi. 350 (1892).
Stann Creek, fl. Jan., *Robertson* 69; Punta Gorda, fl. April, *Robertson* 237; *Peck* 606.

M. fasciata *Jacq.*; Gürke, l.c. 353.
Peck 630.

Pavonia rosea *Schlecht.*
Peck 173.

P. spicata *Cav.*; Urb. Symb. Antill. iv. 397.—*P. racemosa* Swartz.
Mullins River, common, fr. March, *Robertson* 183.

Malvaviscus brevibracteatus *E. G. Baker* in Journ. Bot. 1899, 347.
Belize, in mangrove swamps, fl. and fr. Dec., *Robertson* 34, 35.

M. sp.
Peck 199.

Hibiscus Abelmoschus *L.*
Moloney 31 (fide R. A. Rolfe in Kew MS. Plant Lists, xxxii. 91).

H. costatus *A. Rich.*; Hochr. in Ann. Conserv. et Jard. Bot. Genève, iv. 106 (1900).—*H. australis* Rose ex Donn. Smith, Enum. Pl. Guat. vi. 4 (1903), nomen.
Campbell 17; *Peck* 213.

H. Sabdariffa *L.*
Stann Creek, planted, fl. Jan., *Robertson* 50.
Vernacular name "Sorrel".
Used in cooking.

Paritium elatum (*Swartz*) *G. Don*; M. 62.—*Hibiscus elatus* Swartz; BW. 199.
"Yields a darkish-green wood of great value; as also the celebrated Cuba bast, an article of commerce prepared from the inner layers of the bark" (Morris).
Vernacular name "Mahoe".

Herbarium specimens are desired in order to confirm the record, which may possibly relate to *P. tiliaceum*. Some authors have regarded these two species as synonymous.

P. tiliaceum (*L.*) *A. Juss.*—*Hibiscus tiliaceus* L.; Kew Bull. Add. Ser. ix. 75.

Mullins River, in a marsh close to the sea, *Robertson* 57; *Peck* 105.

Vernacular name " Mahoe ".

A small tree, with straw-coloured flowers (Robertson).

Thespesia populnea *Cav.*

Belize, fl. March, *Robertson* 179.

Vernacular name " Cork tree ".

Gossypium sp.

Stann Creek, *Robertson* 164.

Material insufficient to determine the species.

BOMBACACEAE.

Pachira macrocarpa *Walp.*—*P. aquatica* M. 85; BW. 201; H. 32; non Aubl.

Barlee. Common along river banks and in moist places.

Vernacular name " Provision tree ".

The seeds are sometimes used for food by the natives during times of scarcity (Morris). The timber is used for fencing-posts (Hooper).

Ochroma bicolor *Rowlee* in Journ. Wash. Acad. Sc. 1919, ix. 165.

Hillbank and Stann Creek, *Hummel*; *Peck* 784.

Vernacular name " Polak ".

Flowering material is desired in order to confirm the identification.

O. concolor *Rowlee*, l.c. 161.

Guatemala : Livingston, *Hummel.*

Vernacular name " Polak ".

" It has not been reported from outside of Guatemala, but undoubtedly grows in adjacent Honduras and British Honduras, and in all probability in southern Yucatan " (Rowlee).

O. velutina *Rowlee*, l.c. 164.

By the Rio Grande, at Colombia, *Hummel.*

Vernacular name " Polak ".

The material consists of two detached leaves, which have a less dense indumentum on the lower surface than authenticated specimens in the Kew Herbarium. Good flowering specimens are desired in order to confirm the identification.

Ceiba sp.; M. 44.

Along the banks of the Old River (Morris).

Vernacular name " Silk-Cotton tree ".

A good series of herbarium specimens including young leafy branches still bearing *stipules* (which are caducous), mature leaves, flowering shoots and fruits, are desired. The Silk-Cotton trees of America and the Old World are still very imperfectly known, and several distinct species appear to have been confused under the name *Ceiba pentandra* Gaertn. (*Eriodendron anfractuosum* DC.).

Ceiba sp.

Mullins River, *Hummel.*

Vernacular name "Cotton Wood".

The specimen consists of a single shoot bearing five leaves with 7–9 leaflets each. Flowering shoots and fruits are desired in order to determine the species, which may possibly be identical with the preceding.

The genus *Bombax* doubtless occurs in British Honduras.

STERCULIACEAE.

Helicteres retinophylla *R. E. Fries* in Svensk. Vet.-Akad. Handl. n.s. xlii. no. 12, 23 (1908).

Hooper; *Peck* 96.

According to R. A. Rolfe in Kew MS. Plant Lists, xxxii. 91, verso, *Moloney* 47 (which was treated as a duplicate) was identified as *H. guazumifolia* H.B.K. Until recently several species have been included under *H. guazumifolia*, and it is possible that *Moloney* 47 may have been *H. retinophylla*, which was then undescribed. Hooper's specimen was originally identified as *H. guazumifolia*.

Pentapetes phoenicea *L.*

Campbell 26.

A native of Eastern and Southern Asia. It appears to have become naturalized in British Honduras.

Melochia hirsuta *Cav.*; K. Schum. in Mart. Fl. Bras. xii. pars 3, 45.

Peck 297.

Waltheria americana *L.*; K. Schum. l.c. 63.

Peck 5, 169.

Theobroma angustifolium *DC.* Prodr. i. 184 (1824); Bernoulli, Uebersicht Theobroma, 12, t. 6; Mociño et Sessé, Ic. Ined., ed. A. DC., t. 112 (1874); M. 72?

Morris considered that some of the wild cacao trees seen by him in British Honduras approached *T. angustifolium* in their characters.

T. Cacao *L.*; Bernoulli, Uebersicht Theobroma, 5, tt. 1, 2 fig. 1; M. 72.

Peck 516, 876.

"In the forests along the banks of the Rio Grande and in the neighbourhood of the Toledo Settlement, and again in the forests of the western frontier, near the upper portions of the Belize

River, cacao-trees are found wild in the woods, with their stems covered with flowers, and often loaded with fruit. The trees which came under my notice in the south were probably forms of the same species (*Theobroma Cacao*) which yields the best kinds of Trinidad cacao" (Morris).

Among other species of *Theobroma* which should be looked for in British Honduras are *T. leiocarpa* Bernoulli, *T. pentagona* Bernoulli, and *T. bicolor* H.B.K.

Guazuma tomentosa *H.B.K.?*

The identification is uncertain, being based on a single leafy shoot, without flowers or fruit, gathered at Hillbank by Mr. Hummel, to whom the specimen has been returned.

Vernacular name "Bay Cedar".

Good flowering specimens, and others with fruit attached, are desired in order to determine the species with certainty.

Buettneria carthaginensis *Jacq.*

Peck 260.

B. catalpifolia *Jacq.;* K. Schum. in Mart. Fl. Bras. xii. pars 3, 92, t. 20.

Peck 827.

There appear to be two species referred to *B. catalpifolia* which differ in the fruit. Both range from Brazil to Central America. One has long slender spines, whereas the other has shorter, stouter spines, and somewhat larger fruit. Peck's plant is the latter, and agrees with Schumann's description and figure cited above. The fruit was unfortunately not known to Jacquin, so that it will be difficult to determine with which species he was dealing.

TILIACEAE.

Belotia Campbellii *Sprague* in Kew Bull. 1921, 277.

British Honduras: Seven Hills Estate, *Campbell* 75; Sibun River, *Campbell* 81; Stann Creek, about 12 miles from Stann Creek town, *Hummel;* Manatee, *Hummel* 20; *Peck* 340. Guatemala: Puerto Barrios, *Deam* 146.

Triumfetta Lappula *L.*

Stann Creek, fl. March, *Robertson* 126, 130.

T. sp.

Peck 240.

Specimens bearing mature fruits are required to determine the species.

Corchorus olitorius *L.*

Raised from seed from Belize, British Honduras, *C. F. Baker* 31. An important minor vegetable of tropical gardens. In Nicaragua the natives commonly use the younger leaves in soups (C. F. Baker).

C. siliquosus *L.*

Peck 310.

Luhea platypetala *A. Rich.*
Peck 126.

L. Seemannii *Triana et Planch.*
Seven Hills Estate, *Campbell* 74, 105; *Peck* 644.

The genus *Muntingia*, which was included by Bentham and Hooker (Gen. Pl. i. 236) in *Tiliaceae* tribe *Tilieae*, was transferred by K. Schumann (Mart. Fl. Bras. xii. pars 3, 166) to the tribe *Prockieae*. Schumann afterwards treated the *Prockieae* as belonging to the *Elaeocarpaceae* (Engl. et Prantl, Nat. Pflanzenf. Nachtr. i. 230). but they are now more generally included in the *Samydaceae* (*Flacourtiaceae*).

ELAEOCARPACEAE.

Sloanea eriostemon *Sprague et Riley*, sp. nov.; affinis *S. usurpatrici* Sprague et Riley, a qua ramulis crassioribus rugosis diu velutinis, foliis discoloribus subtus opacis minute setulosis, petiolis velutinis, filamentis dense pilosis, antheris patule pilosis recedit.

Ramuli lignosi, rugosi, crassi, 7 mm. diametro 1 dm. infra apicem, cicatricosi, plus minusve ferrugineo-velutini. *Folia* elliptico-obovata, ambitu generali superne obtusissima vel minute cuspidata, basi rotundata, 15·5–23 cm. longa 11·2–13·5 cm. lata, inferne primo visu integra, revera subtilissime repando-dentata, versus apicem magis conspicue dentata, utrinsecus 12–14–nervia, supra glabra costa nervisque exceptis, subtus valde reticulata, costa nervisque lateralibus valde prominentibus substriatis breviter ferrugineo-pilosis, tertiariis et venulis etiam ultimis minute setulosis; petioli 3–5 cm. longi, medio 2·5–3 mm. diametro, apice basique incrassati, ferrugineo-velutini; stipulae caducae, triangulari-acuminatae, 7·5 mm. longae e basi fere 2 mm. lata. *Inflorescentiae* subsessiles, axillares, compositae, solitariae sed primo visu ter geminive fasciculatae ob ramulos infimos e basi rhacheos primariae orientes, laxe decussato-racemosae, apice subcorymbosae, 3·5–6 cm. longae, internodiis 1–2·5 cm. longis, omnino dense et crispule pilosae; bracteae inferiores ovato-acuminatae, 2 mm. longae, circiter 1 mm. latae, superiores subulatae, circiter 5 mm. longae; pedicelli 0·9–1·5 cm. longae. *Calyx* 4 mm. longus, 5–6-lobus, lobis lanceolato-ovatis acutis 2·75 mm. longis 2 mm. latis. *Petala* nulla. *Stamina* circiter 70, 4·5 mm. longa: filamenta 3 mm. longa, dense pilosa; antherae 1·5 mm. longae, brevissime et obtuse apiculatae, patule pilosae. *Ovarium* elliptico-ovoideum, 1·5 mm. longum, 1·25 mm. diametro, pilis ascendentibus dense obtectum, 4-loculare, loculis 7–8-ovulatis. *Stylus* eccentros, quadrangulatus, valde sulcatus, apice breviter quadrifidus, 3·25–3·5 mm. longus, inferne appresse pilosus. *Fructus* immaturus ellipsoideus, circiter 1 cm. longus, setis patentibus 1·5–2·3 cm. longis setulas minutas rigidas acutas ascendentes gerentibus satis obtectus, calyce persistente patente.

British Honduras. *Peck* 400 (type in Herb. Kew).

A description of a closely allied species from British Guiana hitherto confused with *S. sinemariensis* Aubl. is appended.

Sloanea usurpatrix *Sprague et Riley*, sp. nov.; diu cum *S. sinemariensi* Aubl. confusa, attamen foliis elliptico-oblongis breviter cuspidatis nec suborbicularibus emarginatis, racemis compositis, floribus numerosioribus, calycis indumento facillime distinguenda.

Ramuli juniores valde sulcati, breviter fulvo-pilosi; vetustiores obscure striati, brunneo-nigrescentes, glabriusculi, 5 mm. diametro 1·5 dm. infra apicem. *Folia* elliptico-oblonga, ambitu generali superne rotundata vel obtusissima, breviter acute cuspidata, basi rotundata vel subcordata, 12–24 cm. longa, 7·5–14 cm. lata, obscure et late undulato-crenulata crenulis superne conspicuioribus, coriacea, utrinsecus 9–13-nervia, supra glabra costa nervisque lateralibus sparsissime pilosis exceptis, subtus nitidula, reticulata, nervo medio striato ut nervis lateralibus et tertiariis ferrugineo-piloso, ceterum glabra; petioli 2·5–5·5 cm. longi, medio 2 mm. diametro, apice basique incrassati, striati, sparse pilosi; stipulae caducae, lanceolato-acuminatae, 1 cm. longae e basi 2 mm. lata, molliter fulvo-pilosae. *Inflorescentiae* axillares, solitariae, subsessiles, compositae, laxe decussato-racemosae, 3–4 cm. longae, internodiis 0·5–1 cm. longis, rhachi et ejus ramulis setulis parvis ascendentibus obtectis; bracteae lanceolatae vel subulatae, 3–5 mm. longae; pedicelli 0·5–1·5 cm. longi. *Calyx* 3·5 mm. longus, irregulariter 6–7–lobus, lobis lanceolatis vel lanceolato-ovatis 1·5–2·75 mm. longis 0·75–2 mm. latis acute acuminatis. *Petala* nulla. *Stamina* 70–80, fere 5 mm. longa; filamenta 3·5 mm. longa, sparse et minute patenter pilosa; antherae 1–1·5 mm. longae, sparse et minute appresse pilosae. *Ovarium* globosum, 1·5 mm. diametro, pilis sursum appressis dense obtectum, 4-loculare, loculis 9–10-ovulatis. *Stylus* quadrangulatus, valde sulcatus, apice quadrifidus, 4·5 mm. longus, fere ad medium appresse pilosus, in ovarium gradatim dilatatus. *Fructus* non visus.—*S. sinemariensis* Benth. in Journ. Linn. Soc. v. suppl. ii. 68 (1861) partim, non Aubl.

British Guiana: *Rob. Schomburgk* 1021 partim (type in Herb. Kew); *Rob. Schomburgk* 1044.

II.—HUMBOLDT AND BONPLAND'S MEXICAN ITINERARY.

T. A. Sprague.

The travels of Humboldt and Bonpland laid the foundations of our knowledge of the flora of Mexico. Their Mexican botanical collections comprised about 972 species, most of which were described as new. A knowledge of the localities where these were collected is of great importance to students of the Mexican flora, as it facilitates the task of identification. But many of the place-names cited in the *Nova Genera et Species* are not to be found in any modern atlas or gazetteer. Some of these localities, but not all, are marked in the various maps included in Humboldt's *Atlas Géographique et Physique*, but the discovery of a single place-name may require a prolonged search. Hence it has seemed desirable to publish an index of the Mexican localities visited by Humboldt and Bonpland. For convenience of reference these localities have been numbered in a single series based on the list given in the *Nova Genera*, vii. 433–435, with additional place-names mentioned in the enumeration of Mexican species (l.c. 436–468). Names which may be found in a good atlas are printed in black type. The altitudes are those given by Humboldt: in a few cases more recent estimates have been added in brackets.

A few examples may be given to explain how the Index of localities should be used. The name Ocotlan is followed by the number 148 in the Index: reference to this number in the Itinerary shows that Ocotlan is situated between Mexico and Puebla, and that its altitude according to Humboldt is 7206 ft. Chapoltepec is followed by two numbers, 111 and 136. The Itinerary shows that no. 111 lies between Morelia and Patzcuaro, both well-known places, and that its altitude is 6432 ft. Chapoltepec, No. 136, on the other hand, is situated in the valley of Mexico, at 7150 ft. The only Mazatlan to be found in any ordinary atlas or gazetteer is the important seaport of that name in Sinaloa. Reference to the Index and Itinerary, however, shows that Humboldt's Mazatlan is a small place in Guerrero, between Acapulco and Chilpancingo. Those who desire to fix the position of any locality more exactly may refer to the maps and works cited at the head of each division of the Itinerary. Mazatlan, for example, is marked as a village on map 5 (Mexican section) of Humboldt's Atlas, and is stated, in the Admiralty Handbook of Mexico, p. 354, to be 99 miles distant by road from Acapulco, and 10 miles from Chilpancingo.

ITINERARY.

Acapulco to Mexico city. April 1803.

(See H.B.K. Nov. Gen. vii. 433; Humb. et Bonpl., Voyage, Atlas Géogr., Mex. tt. 5, 13; Admiralty Intell. Div. 1205, Handbook of Mexico, 353; Gadow, Through Southern Mexico, chapters xvi-xix., xxii.)

1 **Acapulco**; 2 Cojuca (Coyuca), Playas de; 3 Cuesta del Limon; 4 Venta del Exido (Egido, Ejido), 1278 ft.; 5 Tambo del Exido; 6 Alto del Camaron, 1230 ft.; 7 Alto de los Pozuelos, 1380 ft.; 8 Valle del Peregrino, 492 ft.; 9 Alto del Peregrino, 1074 ft.; 10 Valle del **Papagayo** (**Papagallo**), 582 ft.; 11 Venta de Tierra Colorada, 1224 ft.; 12 Venta de la Moxonera, 2280 ft.; 13 Quaxiniquilapa; 14 Alto de los Caxones, 3510 ft.; 15 Acaguisotla, 3024 ft.; 16 Masatlan (Mazatlan), 3906 ft.; 17 Chilpanzingo (Chilpansingo,

Chilpancingo), 4248 [4527] ft.; 18 Sumpango (**Zumpango**) 3360 ft.; 19 Sochipala; 20 Cañada de Sopilote (**Zopilote**); 21 Valle de Sopilote (**Zopilote**), 3102 ft.; 22 Mescala (**Mexcala**), 1590 ft.; 23 Rio de Mescala (**Mexcala**); 24 Estola, Venta de, 2532 ft.; 25 **Tepecuacuilco,** 3108 ft.; 26 Tehuilotepec, 5514 ft.;. 27 **Tasco** (Taxco), 5508 [5500] ft.; 28 Guasintlan, 3228 ft.; 29 **Puente de Ixtla** (Istla), 3024 ft.; 30 Acamistla; 31 **Cuernavaca**, 5094 [4500] ft.; 32 Guchilaque, 7518 ft.; 33 La Cruz del Marqués, 9222 ft.; 34 El Guarda; 35 San Agustín de las Cuevas, 7146 ft.; 36 **Tezcuco,** Laguna de, 6996 ft.; 37 **Mexico** city (Tenochtitlan), 7008 [7466] ft.

Between Mexico city and Actopan (State of Hidalgo), May-June 1803.

(See H.B.K. Nov. Gen. vii. 434; Humb. et Bonpl. Voyage, Atlas Géogr. t. 7, Mex. t. 1, S. half; Admiralty Intell. Div. 1205, Handbook of Mexico, 390.)

38 Carpio, 7080 ft.; 39 Gasave, 7392 ft.; 40 **Pachuca,** 7638 [8024] ft.; 41 La Cruz del Cerro Ventoso, 8544 ft.; 42 San Pedro, Mina de; 43 **Real del Monte,** 8556 ft.; 44 Biscaina, Mina de la; 45 Moran (Real de Moran), 7986 ft.; 46 Cabrera; 47 Omitlan, 7578 ft.; 48 Llano de las Tinajas (Tinaxas), 8364 ft.; 49 El Oyamel, 9468 ft.; 50 Cerro de las Nabajas (Navajas); 51 El Jacal, 9618 ft.; 52 El Zembo, 7062 ft.; 53 Hacienda de San Miguel, 6666 ft.; 54 Hacienda de Regla, 6216 ft.; 55 **Atotonilco el Grande** (Totonilco el Grande), 6756 ft.; 56 Dantoe, Cueva de (Puente de la Madre de Dios), 5310 ft.; 57 La Magdalena, 6036 ft.; 58 **Actopan,** 6264 ft.; 59 Mamanchota (Los Organos de Actopan), 8982 ft.

Between Mexico city and Guanajuato, Aug.-Sept. 1803.

(See H.B.K. Nov. Gen. vii. 434; Humb. et Bonpl. Voyage, Atlas Géogr. t. 30, Mex. tt. 1, S. half, 3, 14; Admiralty Intell. Div. 1205, Handbook of Mexico, 350.)

60 Tlanepantla (Tanepantla); 61 Cuesta de Varientos, 7266 ft.; 62 Guautitlan (Huautitlan); 63 **Huehuetoca** (Gueguetoque), 7068 ft.; 64 Cerro de Sincoq; 65 Cerro de Nochistongo; 66 Puerto de Reyes, 7248 ft.; 67 **Tula,** 6318 ft.; 68 Hacienda de San Antonio, 6726 ft.; 69 Calpulalpan, 8274 ft.; 70 Arroyozarco, 7770 ft.; 71 **San Juan del Rio,** 6084 ft.; 72 Hacienda de Lira, 5970 ft.; 73 Cuesta de la Noria, 6498 ft.; 74 **Querétaro,** 5970 [5947] ft.; 75 Zelaya (**Celaya),** 5646 ft.; 76 El Molino de Sarabia, 5502 ft.; 77 **Salamanca,** 5406 [5646] ft.; 78 Temascatio, 5574 ft.; 79 Marfil, Cañada de; 80 **Guanajuato,** 6414 [6600] ft.; 81 Valenciana, Mina de, 7116 ft.; 82 Rayas, Mina de, 6696 ft.; 83 Belgrado, Mina de, 7530 ft.; 84 Cerro de Serena, 7644 ft.; 85 Ovejeras; 86 Santa Anita; 87 La Bufa de Guanajuato; 88 Cañada de Acabuca; 89 Cubilete; 90 Gigante; 91 Santa Cruz de la Sierra; 92 Animas, Mina, 6828 ft.; 93 Mellado, Mina, 7026 ft.; 94 Puerto de Varientos, 8256 ft.; 95 Santa Rosa de la Sierra, 7746 ft.; 96 Los Joares, 8154 ft.; 97 Puerto de Santa Rosa, 8664 ft.; 98 Villalpando, Mina de; 99 Comangillo, 6600 ft. (6 m. from Silao).

Between Guanajuato and the volcano of Jorullo, Sept. 1803.

(See H.B.K. Nov. Gen. vii. 435; Humb. et Bonpl. Voyage, Atlas Géogr. tt. 28, 29, 30, Mex. t. 1, S. half.)

100 Cuevas, 6012 ft.; 101 Burras, 5682 ft.; 102 Lo de Sierra; 103 **Valle de Santiago** (Sancti Jacobi convallis) [5630 ft.]; 104 Valle de Palangeo, 5370 ft.; 105 Alberca de Palangeo; 106 Puerto de Andaracuas, 5490 ft.; 107 Yurirapundaro; 108 **Cuitzeo** (Cuiseo), Laguna de; 109 Valladolid de Mechoacan [**Morelia**] 6006 [6200] ft.; 110 Capula, 6450 ft.; 111 Chapoltepec, 6432 ft.; 112 **Patzcuaro** (Pazcuaro), 6774 [6717] ft.; 113 **Ario,** 5964 ft.; 114 Aguasarco, 4686 ft.; 115 Rio San Pedro; 116 Inguaran (Ynguaran); 117 Cerro de las Cuevas; 118 Las Playas de Jorullo, 2922 ft.; 119 Mal Pays; 120 **Volcan de Jorullo,** 4002 ft.

Between Valladolid de Mechoacan [Morelia] and Mexico city, Sept.–Oct. 1803.

(See H.B.K. Nov. Gen. vii. 435; Humb. et Bonpl. Voyage, Atlas Géogr., Mex. t. 1, S. half, 3; Admiralty Intell. Div. 1205, Handbook of Mexico, 341.)

121 Carpio, 5868 ft.; 122 Tepare, 5910 ft.; 123 Cinapecuaro (**Zinapecuaro**), 5808 ft.; 124 Ocambaro (**Acambaro**), 5742 [6036] ft.; 125 **Maravatio,** 6300 ft.; 126 **Tepetongo,** 7110 ft.; 127 Islahuaca (**Ixtlahuaca**), 7956 ft.; 128 Rio Sarco, 5880 ft.; 129 **Toluca,** 8274 [8761] ft.; 130 **Nevado de Toluca,** 14232 ft.; 131 Cerro de las Cruces, 9882 ft.; 132 Tianguillo, 9030 ft.

Valley of Mexico, 1803–1804.

(See H.B.K. Nov. Gen. vii. 433; Humb. et Bonpl. Voyage, Atlas Géogr., Mex. tt. 3, 15.)

133 Peñol de los Baños; 134 Guadalupe; 135 Tlatelolco, Santiago de; 136 Chapoltepec, 7150 ft.; 137 **Tezcuco**; 138 Iztapalapan; 139 Xochimilco; 140 Tlanepantla; 41 Guautitlan (Huautitlan); 142 San Christobal (S. Christophorus); 143 Carpio; 144 El Peñon (rupes).

Between Mexico city and Perote (State of Vera Cruz), Jan.–Feb. 1804.

(See H.B.K. Nov. Gen. vii. 435; Humb. et Bonpl. Voyage, Atlas Géogr., Mex. tt. i, S. half, 3, 9, 12; Admiralty Intell. Div. 1205, Handbook of Mexico, 396.)

145 Venta de Chalco, 7236 ft.; 146 Venta de Córdoba, 8154 ft.; 147 Rio Frio, 9492 ft.; 148 Ocotlan, 7206 ft.; 149 **Puebla** de los Angeles, 6750 [7100] ft.; 150 **Cholula,** 6480 ft.; 151 Llano de Tetimpa, 7404 ft.; 152 **Popocatepetl,** 16626 ft.; 153 **Iztaccihiuatl,** 14736 ft.; 154 Cocosingo; 155 El Pinar, 7854 ft.; 156 Venta de Soto, 7206 ft.; 157 **Perote**, 7242 ft.

Between Perote and Vera Cruz, Feb. 1804.

(See H.B.K. Nov. Gen. vii. 435; Humb. et Bonpl. Voyage, Atlas Géogr., Mex. tt. 1, S. half, 9, 12; Admiralty Intell. Div. 1205, Handbook of Mexico, 396.)

158 Pinahuistepec, 9006 ft.; 159 **Cofre de Perote** (Nauhcampatepetl) 12582 ft.; 160 El Manzanillo (Barranca Honda); 161 Las Vigas, 7332 ft.; 162 Cuesta del Soldado, 5892 ft.; 163 La Pileta, 4740 ft.; 164 La Banderilla, 4500 ft.; 165 **Xalapa (Jalapa)**, 4062 [4681] ft.; 166 Rio Chachalacas; 167 Cerro de Macultepec, 4728 ft.; 168 **Orizaba**, 16302 ft.; 169 Encero, 2976 ft.: 170 La Rinconada, 834 ft.; 171 La Antigua; 172 **Vera Cruz.**

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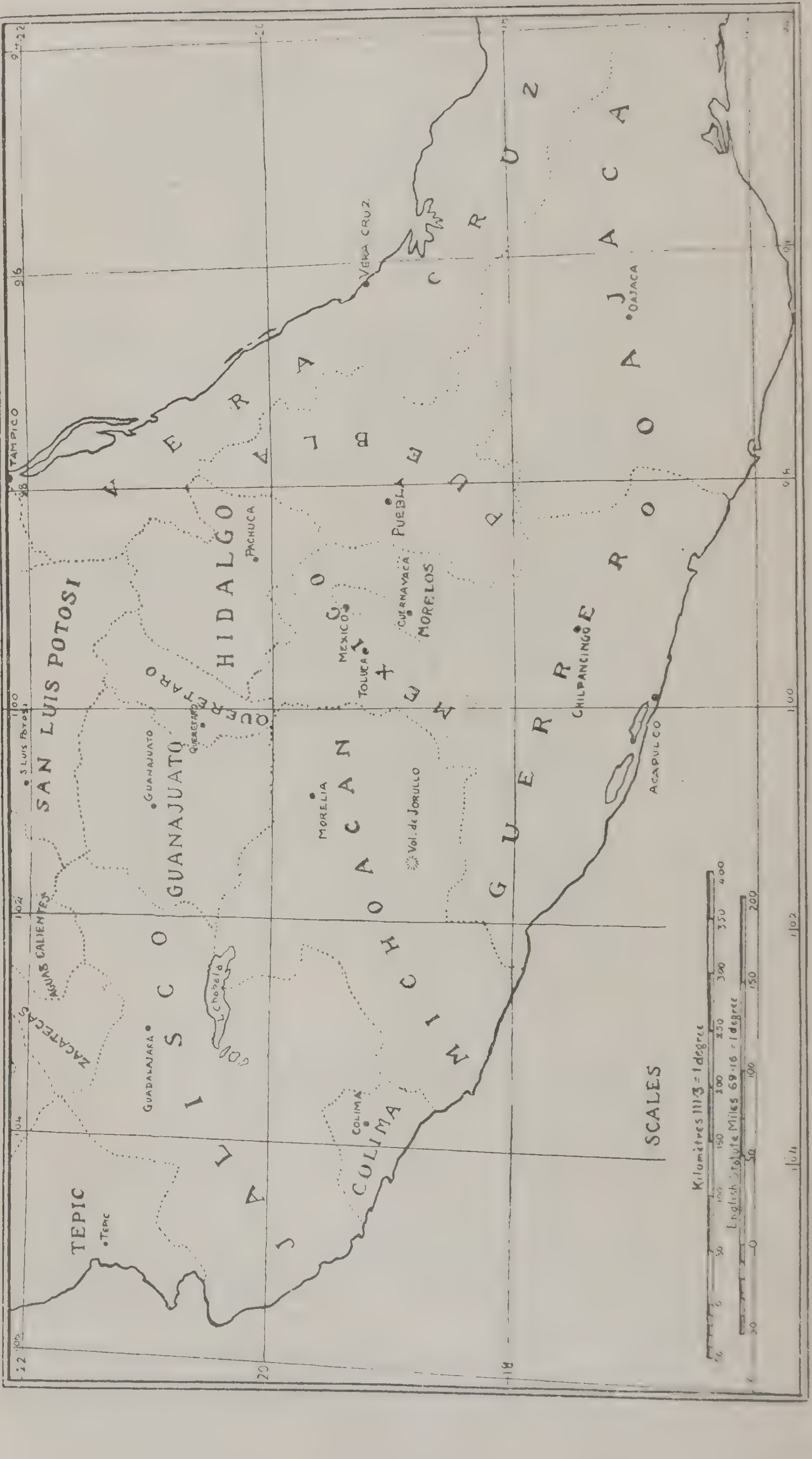
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AGUAS CALIENTES
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Morelia
Vol. de Jorullo
GUANAJUATO
Guanajuato
SAN LUIS POTOSI
S. Luis Potosi
QUERETARO
Queretaro
HIDALGO
Pachuca
MEXICO
Toluca
Mexico
MORELOS
Cuernavaca
PUEBLA
Puebla
VERA CRUZ
Vera Cruz
Tampico
GUERRERO
Chilpancingo
Acapulco
OAJACA
Oajaca
SCALES
Kilometres 111.3 = 1 degree
English Statute Miles 69.16 = 1 degree
22
20
18
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104
102
100
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III.—MISCELLANEOUS NOTES.

The following appointments have been made by the Secretary of State for the Colonies:—

MR. L. P. HENDERSON, B.Sc., to be Agricultural Instructor, Training College, Tanjong Malim, Federated Malay States; LIEUT. J. H. HUNTER, M.A., B.Sc., to be Agricultural Instructor, Njala Agricultural College, Sierra Leone; CAPTAIN C. W. J. LINE, B.A., Dip.Agric., to be Deputy Director of Agriculture, Gambia; LIEUT. D. H. URQUHART, B.Sc., to be Superintendent, Agricultural Department, Nigeria.

THOMAS FREDERICK CHEESEMAN.—The death of Mr. T. F. Cheeseman, F.L.S., F.Z.S., which was recorded in the last number of the *Bulletin* for 1923, removes a personality which has dominated New Zealand botanical research for the last half century.

Mr. Cheeseman was born at Hull, Yorkshire, in 1846, and accompanied his parents to Auckland in 1854, where he completed his education. After leaving school he spent some years in studying botany, in the course of which he explored the North Island and laid the foundations of his later work on the New Zealand flora and vegetation. Locally he was identified with the Auckland Museum almost from its inception, and his wide knowledge of natural history, in addition to the special subject of botany, enabled him in his capacity as Curator, which post he held since 1874, to build up the interesting and valuable collec tions for which not only Auckland but New Zealand generally is indebted. In a letter to Kew in 1921 he states how gratified he was at the donations which had made possible the building of a new Museum as a War Memorial, to which he was presenting his own splendid herbarium. Unfortunately he was not destined to see this project completed.

Mr. Cheeseman had for many years been a frequent and intimate correspondent of Kew and an occasional contributor to the *Kew Bulletin*. He had also from time to time sent herbarium specimens and seeds of plants of interest to the Kew collections.

His principal contributions to the study of the New Zealand flora, of which he was an acknowledged authority, are :—A Manual of the New Zealand Flora, Illustrations of the New Zealand Flora, Botany of the Three Kings Islands, Flora of the Kermadec Islands, Systematic Botany of the Islands to the South of New Zealand, Vascular Flora of Macquarie Island, and the Flora of Raratonga.

DR. C. F. MILLSPAUGH.—We have to record with sincere regret the death of Dr. Charles Frederick Millspaugh in his 70th year, on September 15th, 1923, after a six months' illness.

Dr. Millspaugh was a nephew of Ezra Cornell, the founder of Cornell University, and had devoted much time to botanical exploration, especially in Mexico, Brazil and the Antilles. He had been Curator of the Department of Botany in the Field Museum of Natural History at Chicago for nearly thirty years and was on the most friendly terms with Kew, spending several days in the Herbarium during his visit to Europe in 1922.

J. H. TURNER.—We regret to learn of the death of Mr. J. H. Turner, which took place on the 9th of December last at Richmond, Surrey.

It was to Mr. Turner's kindly interest as Agent-General for British Columbia that Kew is indebted for the fine Douglas fir flagstaff which is such a striking and interesting feature in the Gardens.

Although it actually replaced the old flagstaff when the latter had to be taken down, Mr. Turner had previously originated the idea of obtaining a specimen of a British Columbian tree for public exhibition in London. On learning, however, that Kew was without a flagstaff he at once arranged for this new tree to be sent to the Gardens, where it was erected on the 18th October, 1919 (*K.B.* 1919, p. 393).

Visitors during 1923.—The number of visitors to the Gardens in 1923 was 1,186,662. This was an increase of 42,904 over those recorded for the previous year.

Garden Operations, 1923.—Roses. In last year's report on Garden Operations during 1922 (*K.B.* 1923, p. 44) mention was made of the fact that a commencement had been made to transform the planting of the sunken area south-west of the Palm House from a miscellaneous collection of shrubs to an extension of the rose garden already existing in the neighbourhood. The work has now been completed, the beds having been furnished with new soil and planted with a selection of good varieties of garden roses. The roses planted last year succeeded well, and as each bed was underplanted with violas they gave a very attractive display of colour much appreciated by visitors during summer and autumn. There is now in the Palm House area a representative collection of these roses. The number of beds is 113, each bed being planted with a single variety, the number of plants in each bed varying from 24 to 110. The total number of plants grown is approximately 6,000. Visitors or students interested in roses have three other areas in Kew available to them : there is the pergola near the Rock Garden where climbing varieties are grown ; the Rose Dell near the Pagoda, devoted to the ramblers ; finally the botanical collection of species and wild varieties.

The broad gravel walk which traversed that section of the Sion Vista occupied by the sunken area alluded to in the previous paragraph—the last remnant of the gravel walk which once extended the whole length of the vista as it was planned by Nesfield in 1845—has been grassed over. An expanse of turf, broken only by four crosspaths of gravel, now stretches from the Palm House steps to the Thames boundary—about 1000 yards.

Collection of Ericaceae. The introduction of many new species of rhododendrons from China by Messrs. Forrest, Kingdon Ward and Farrer has rendered necessary the provision of more space for them. The botanical collection of the heath family is grown near King William's Temple, and the last of the miscellaneous shrubberies there has now been appropriated. This is the tongue-shaped piece of ground sloping from the temple towards the Temperate House, A fine example of *Ailanthus glandulosa* stands in the centre, round the trunk of which a wooden seat for the convenience of visitors has been placed, reached by two grassy paths. At the base of the slope a terrace has been built approached by steps that balance those of the Himalayan House at the other end of the straight walk bordered by boxes, lilacs and Phillyreas (I. 8 on Key-plan).

The gravel walk on the west side of the Water lily house (No. 15) has been carried all round it so that visitors on the lawn between the Broad Walk and this house may reach it without having to make the detour previously necessary.

Rain water Tanks. Arising out of the disastrous effects of saline water from the Thames on the plant collections during 1921, an adequate system of tanks for the collection and storage of rain water has been installed in the plant houses by H.M. Office of Works. From the horticultural point of view this is the most beneficial thing conferred on the establishment for many years. Gardeners have long known that the best of all water for plants is that which falls from the skies. Up to this year it has, except in the Palm House, Temperate House and Ferneries, been allowed largely to run to waste. A distinct improvement in the health of many of our indoor collections is already manifest. Although it needed the drought of 1921—unprecedented since Kew became a public institution—to bring the matter to a head, there is no doubt that during previous and lesser droughts saline matter in the Thames water has caused ill-health to the plants without the real cause being known, being attributed instead to negligence or unskilful treatment.

The effects of the same drought on the old trees in the grounds are still unhappily too apparent; several fine old beeches, planted no doubt in the 18th century during the time of Queen Caroline, died during the summer and have had to be uprooted. A regrettable loss, too, is that of the large old willow oak (*Quercus Phellos*) which stood on the lawn south of the T. Range (E. 10 on the Key Plan). This tree, whose trunk was about 12 feet in girth, is mentioned by Elwes and Henry in the "Trees of Great Britain and Ireland" as one of the finest specimens in the British Isles. The trunk was quite decayed and hollow in the centre and the wrenching off of two large limbs during an autumn gale completely ruined it. The species is still represented at Kew by a smaller but fine and perfectly healthy tree on the Palace Lawn, as well as by others in the Oak collection.

The tropical fernery has been repainted and much of the roof repaired. The orchid houses and several small private houses have also been repainted.

A very interesting tree which flowered at Kew in July, for the first time it is believed under cultivation, was *Cladrastis tinctoria* Hemsley. It was originally discovered in Szechuan, in 1890, by Mr. E. A. Pratt, but not introduced until 1901, when Mr. E. H. Wilson sent home seeds from Hupeh to Messrs. Veitch at the Coombe Wood Nursery. The flowers, numerously borne in terminal panicles, are white and fragrant. Blossoming as it does in late July, the species promises to become a valuable flowering tree, and Kew is fortunate in possessing three healthy specimens. A flowering spray was figured in the Gardeners' Chronicle for August 4th, 1923 (fig. 27).

Two of the largest plants in the Succulent House flowered during the year, viz.—*Agave atrovirens* var. *latissima* and *Furcraea cubensis* var. *Lindenii*.

In the Rock Garden a batch of plants of *Aster heterochaeta* raised from seeds collected during the Mount Everest Expedition made a pretty display.

During the summer most of the gravel paths at the northern or "Botanic Garden" end of the grounds were treated with hot tar and pea gravel. The initial expense in regard to plant and material is somewhat heavy, but the process will eventually prove economical owing to the saving of labour involved in the upkeep of ordinary gravel paths. The paths are also made much more comfortable for visitors to walk upon, especially during long spells of dry weather. The work will be continued during favourable weather in 1924.

ADDITIONS TO GARDENS, 1923. The number of separate consignments of living plants, seeds, etc., to the Gardens was 634, an increase of 169 on those of 1922. The most important were the following :—

Arnold Arboretum.—Seeds and plants.
Berlin Botanic Garden.—Collection of plants and seeds.
Brooklyn Botanic Garden.—58 packets of seeds.
Brussels Botanic Garden.—Collection of plants and seeds.
Calcutta Botanic Garden.—Seeds of *Trapa bispinosa*, *Thermopsis barbata* ; numerous plants, including tubers of *Amorphophallus campanulatus*.
Cambridge Botanic Garden.—Grafts of *Platanus cantabrigensis* ; plants, including *Clusia grandiflora* and hardy *Opuntia* spp.
Copenhagen Botanic Garden.—Numerous plants and a collection of bulbs.
Dendrological Society, Pruhonice, Prague.—Collection of trees and shrubs.
Edinburgh Botanic Garden.—609 packets of seeds collected by Mr. G. Forrest ; herbaceous and alpine plants ; *Rhododendron* and *Nepenthes* spp.
Glasgow Botanic Garden.—Numerous plants and cuttings.
Glasnevin Botanic Garden.—Plants, including *Epidendrum congestum*.
John Innes Horticultural Institution, Merton.—Plants.
National Botanic Garden, Kirstenbosch, S. Africa.—Numerous seeds, including *Erica* spp.
Kumaon Botanic Garden.—Seeds of *Holmskioldia sanguinea*.
Lloyd Botanic Garden, Darjeeling.—308 packets of seeds.
Ootacamund Botanic Garden.—Seeds and plants.
Ottawa Central Experimental Station.—44 packets of seeds.
Palermo Botanic Garden.—108 packets of seeds.
Paris, Muséum d'Histoire Naturelle.—72 packets of seeds.
Penang, Botanic Garden.—Tubers of *Amorphophallus* sp. and Wardian cases of plants.
Peradeniya, Royal Botanic Garden.—Seeds, including *Hevea brasiliensis*.
Pretoria, Division of Botany.—Bulbs, *Urginea macrocentra*.
Royal Botanic Society of London.—*Cocos nucifera*.
Royal Horticultural Society, Wisley.—Plants.
Sapporo Botanic Gardens, Japan.—64 packets of seeds.

Singapore Botanic Gardens.—Dwarf Coconuts. Wardian cases of native plants.

St. Louis Botanic Garden.—Tubers of Nymphaeas.

Sydney Botanic Gardens.—Seeds including *Acacia Bidwillii*, *Eucalyptus erythrocorys*.

Tiflis Botanic Garden.—60 packets of seeds.

Tokio Botanic Garden.—91 packets of seeds.

Trinidad, Dept. of Agriculture.—Seeds, including *Melinis minutiflora*, and Wardian case of plants.

United States Dept. of Agriculture.—Seeds and plants.

Zurich Botanic Garden.—63 packets of seeds and numerous plants, including *Prinsepia utilis*.

Mr. B. C. Aston, Wellington, N.Z.—Seeds.

Miss Balfour, Whittingehame.—Seeds, *Eucalyptus whittingehamensis*.

Mr. A. C. Bartholomew, Reading.—Herbaceous plants and seeds.

Mr. E. E. Battiscombe, Nairobi.—Seed of *Huernia* sp.

The Belize Estate and Produce Co., Ltd., London.—Suckers of " Silk Grass " from British Honduras.

Mr. J. Bintner, Luxemburg.—Collection of Hydrangeas.

Col. Bird, Australia.—Seeds of Australian plants.

The Bishop of Northern Rhodesia.—Bulbs and tubers.

Mr. E. A. Bowles, Waltham Cross.—Plants and cuttings.

Mr. W. H. Boyle, Annesley.—Case of Javanese orchids.

Mr. D. Brodie, Abyssinia.—Seeds of Abyssinian plants including *Kniphofia* spp., *Rosa sancta*, etc.

Mr. N. E. Brown, Kew.—Plants and seeds of Cape succulents.

Lt.-Gen. Sir A. G. F. Browne, Farnham.—Orchids.

Mr. A. K. Bulley, Neston.—Alpines.

Mrs. Burgmann, Natal.—Seeds, *Lilium* sp.?; tubers, *Lissochilus* sp.?

Mr. W. J. Burstow, Brighton.—Plants, *Hymenophyllum tunbridgense*.

Mr. J. Burtt Davy, Kew.—Seeds of *Vigna Rogersii*.

Major W. F. Chipp, Simla.—Seeds of Himalayan plants.

Mr. H. E. Chubb, London.—Case of Orchids from South America.

Dr. L. Cockayne, Wellington, N.Z.—84 packets of seeds of New Zealand plants.

Sir Jeremiah Colman, Bt., Gatton Park.—Orchids.

Mr. H. Correvon, Geneva.—Seeds of Alpines.

Mr. R. Cory, Cardiff.—Seeds and plants.

Mr. M. T. Dawe, Sierra Leone.—Plants of *Crinum natans* and orchids; numerous seeds.

Donard Nursery Co., Ireland.—Hardy trees and shrubs.

Major A. A. Dorrien-Smith, Tresco.—Trees and shrubs.

Mr. C. Eley, East Bergholt.—Rhododendrons.

Miss F. Gallaher, London.—Large plant, *Trichomanes radicans*.

Hon. Vicary Gibbs, Aldenham.—Trees, shrubs and herbaceous plants.

Messrs. R. Gill and Sons, Falmouth.—Himalayan Rhododendrons.

Dr. J. Goffart, Tangier.—Seeds, *Acacia* spp.; *Testudinaria elephantipes.*

Mr. E. E. Gunther, Hawkhurst.—Seeds and plants of succulents.

Mrs. M. C. Hammond, Salisbury.—*Pelargonium Cotyledonis* from St. Helena.

Commendatore C. Hanbury, La Mortola.—224 packets of seeds.

Mr. R. R. Hayes, Ambleside.—Hardy heaths.

Marquis of Headfort, Kells, Co. Meath.—Seedling Rhododendrons; seeds of *Pieris taiwanensis.*

Mr. W. L. Heape, Somaliland.—Seeds of *Cordeauxia edulis.*

Prof. A. Henry, Dublin.—Seeds of trees and shrubs.

Mr. J. Hers, China.—99 packets of seeds.

Mr. R. Hickel, France.—*Populus Hickeliana.*

High Commissioner for New Zealand.—Seeds of *Olearis insignis.*

High Commissioner for the Union of South Africa.—Collections of Cape plants.

Messrs. Hillier & Sons, Winchester.—Trees and shrubs.

H.H. the Maharaj Rana of Jhalawar, Rajputana.—Plants.

Sir G. Holford, Westonbirt.—68 Hippeastrums in variety.

Mr. B. H. Horsley, Somaliland.—Seeds of *Cordeauxia edulis.*

Miss Jones, Clevedon.—Miscellaneous South African plants and seeds.

Mr. R. Kett, Thrace.—Bulbs and seeds from Gallipoli.

Dr. A. F. G. Kerr, Siam.—*Dendrobium ciliatum*; seeds and tubers of Siamese plants.

Capt. F. Kingdon Ward.—60 packets of seeds.

Mr. C. H. Lankester, Costa Rica.—Orchids, seeds and fern spores.

Mrs. Lee Milne, Sierra Leone.—Orchids.

Mr. J. Leighton, S. Africa.—Cape plants, including *Cyrtanthus Leightoni.*

Mr. G. W. E. Loder, Brighton.—Numerous plants and cuttings.

Miss Mason, Rondebosch, S.A.—Seeds and bulbs of Cape plants.

Sir J. Stirling Maxwell, Bart., Pollokshaws, Glasgow.—Rhododendrons.

Mr. J. A. McPherson, Kew.—79 packets of seeds of New Zealand plants.

Lt.-Col. Messel, Nymans, Haywards Heath.—Trees and shrubs.

Mr. C. T. Musgrave, Godalming.—Seeds and plants of Alpines, etc.

Mr. W. Napier Church, Sandhurst.—Plant, *Phoenix Roebelinii.*

The O'Mahony, Coolballintagart.—Plants.

Major A. Pam, Broxbourne.—Bulbs from Asia Minor, and Peruvian seeds.

Mr. R. N. Parker, Dehra Dun.—Seeds of Indian plants, including *Jasminum Parkeri.*

Mr. E. E. Pescott, Melbourne.—Collection of seeds, including *Bossiaea Laidlawiana.*

Mr. N. S. Pillans, S. Africa.—Cape plants, including *Mesembryanthemum Pillansii.*

Mr. W. R. Price, London.—Pleiones.

Dr. A. Ragionieri, Italy.—Roots of Florentine Ranunculus.

Sir J. Ramsden, Gerrards Cross.—*Gladiolus* spp. from Kenya Colony.

Mr. G. Reuthe, Keston, Kent.—Hardy trees and shrubs, and *Telopea truncata.*

Mrs. V. Rey, Hyde Park.—*Aloe* spp. and *Scilla* sp. from Abyssinia.

Lt.-Col. M. B. Roberts, Barnes.—28 orchids from Manipur State, Assam.

Dr. J. N. Rose, Washington.—*Sedum* spp., *Lenophyllum guttatum.*

Sir John Ross of Bladensburg, Rostrevor.—Seed of *Clethra Delavayi.*

Major L. de Rothschild.—Seed of *Daubentonia Tripetii*; plants of Rhododendrons and Liliums.

Messrs. Rowntree & Co., Ltd., York.—Plants, *Theobroma Cacao* vars.

Dr. Scale, Bath.—Seeds from New South Wales.

Mr. T. Sharp, Westbury.—Seeds and seedlings, including *Aloe Thorncroftii.*

Mr. H. Steedman, W. Australia.—Seeds. including *Eucalyptus erythrocorys.*

Mr. J. B. Stephenson, Ascot.—A collection of Rhododendron seedlings raised from Capt. Kingdon Ward's seeds.

Messrs. Sutton & Sons, Reading.—10 varieties of *Cyclamen.*

Mr. C. F. M. Swynnerton, Tanganyika.—*Aloe* sp. from Tanganyika.

Mr. E. Taylor, Tunbridge Wells.—Plants and cuttings of succulents.

Mr. C. G. Teschemaker, New Zealand.—Seeds of *Notospartium torulosum.*

Mr. G. Thorncroft, Barberton, S.A.—Seeds of Transvaal plants.

Dr. A. H. Unwin, Cyprus.—Seed of *Cedrus Libani* var. *brevifolia.*

Messrs. Vilmorin-Andrieux & Cie., Verrières le Buisson, France.—59 packets of seeds collected by J. Hers in Honan Prov. China, and numerous packets of miscellaneous seeds.

Mr. D. Vyvyan, Natal.—*Encephalartos Frederici-Guilielmi.*

Mr. F. G. Walsingham, Egypt.—*Nelumbium speciosum* (white form).

Mr. O. E. Warburg, London.—Herbaceous plants. shrubs, rare British plants.

Mr. J. C. Williams, Caerhays.—259 packets of seeds, including *Enkianthus quinquefolius*, and plants of numerous species of *Rhododendron.*

Mr. P. D. Williams, Lanarth.—Rhododendrons.

Surplus plants from the various collections were distributed as usual, either in exchange with botanic gardens. nurserymen. etc., or as gifts to teaching institutions. The total number of packets of seeds distributed was 2,849 of hardy trees and shrubs, and 4,779 of hardy herbaceous plants. The most important of the seeds obtained for special distribution were *Jasminum Parkeri, Melinis minutiflora* (Efwatakala grass), *Cedrus Libani* var. *brevifolia, Holmskioldia sanguinea, Juniperus Cedrus, Cordeauxia edulis* (Yeheb Nut), and *Juniperus bermudiana.* Seeds of *Trapa bispinosa* were grown at Kew and plants were distributed to the leading botanical institutions.

Wardian cases of plants were sent to the Botanic Gardens of Trinidad, Singapore, Bangalore, Amani Institute, Tanganyika Territory, and to the Gambia Department of Agriculture.

The recipients of plants, etc., from Kew, included the following :—

King's College, Cambridge.—Trees and shrubs.

Arnold Arboretum, Mass., U.S.A.—Seeds, plants and cuttings of hardy trees and shrubs.

Edinburgh Botanic Garden.—Plants, cuttings and seeds, including *Jasminum Parkeri*, *Arundinaria Murielae*, and *Nepenthes* spp.

Estates Department, Pretoria, S.A.—Cuttings of *Salix caerulea*.

Glasgow Botanic Gardens.—Collection of tropical plants and seeds.

Forestry Commission.—3265 cuttings of *Populus* and *Salix* spp.

Imperial War Graves Commission.—Plants of *Acer rubrum*, *A. macrophyllum*. Seeds of *Eucalyptus whittingehamensis*

Messrs. Sutton & Sons, Reading.—*Primula calciphila*, collection of Begonias, etc.

Horticultural College, Swanley.—Stove and greenhouse plants.

School of Tropical Medicine, Liverpool.—Seed of *Melinis minutiflora* (Efwatakala Grass).

Hon. Vicary Gibbs, Aldenham.—Hardy trees and shrubs.

New York Botanic Garden.—Cuttings of *Anthurium* spp.

Mr. P. D. Williams, Lanarth.—Rhododendrons and hardy trees and shrubs.

Glasnevin Botanic Garden.—Collection of stove and hardy plants.

Dr. I. B. Henry, Reading.—*Theobroma Cacao* vars., *Hevea brasiliensis*, etc.

Prof. Poirault, Antibes.—Collection of fern spores.

Oxford Botanic Garden.—Cuttings of *Salix caerulea*, collection of tropical ferns.

Department of Agriculture, Melbourne.—Seeds of *Lilium* spp.

Cambridge Botanic Garden.—Hardy shrubs.

Singapore Botanic Garden.—Large collection of succulents.

Miss Willmott, Great Warley.—Herbaceous and Alpine plants.

Dr. B. Moiser, Kaduna, Nigeria.—Collection of bulbs and seeds.

Punjab Dept. of Agriculture, Lyallpur.—Seeds of *Acacia* spp.

Earl of Leicester, Holkham.—Hardy trees and shrubs.

Petrograd Botanic Garden.—Seeds, *Victoria regia*.

Museums.—The past year has been a busy one for the staff in clearing up accumulations of products of doubtful origin and, in conjunction with Mr. L. A. Boodle, Assistant Keeper of the Jodrell Laboratory, in dealing with the large amount of material submitted for determination and report by commercial firms, scientific institutions and correspondents in all parts of the world. In addition, much time and attention has been devoted to visitors to the Museums, including students, seeking information upon special subjects. It is also gratifying to record that, as in previous years, many parties of school children, accompanied by their teachers, have visited the collections. Three special exhibits that attracted considerable attention were made during the year, viz., Ancient Egyptian Wreaths etc., Sports Requisites and Nigerian Dyes. All available time has been devoted to improving generally the permanent collections, to which many interesting products have been added, and duplicate material has been distributed to the following institutions; the Pharmaceutical Society; Goldsmith's College, New Cross; Department of Botany, Marischal College, Aberdeen; The Universities of Aberystwyth and Manitoba and to the Winton Laboratories, Conn., U.S.A., and others. Official visits were made by the Keeper of Museums to Hull and to Copenhagen for the Museums Association Annual Conference, and by Mr. Dallimore to French forests with the Royal English Arboricultural Society.

PRESENTATIONS TO MUSEUMS.—The following miscellaneous specimens have been received :—

Mr. N. E. Brown, Kew Gardens.—Sticks of Deal as used for making matches between 1830 and 1840.

Captain R. W. Brent, Gold Coast.—Sample of Sindru bark (*Alstonia congensis* Engl.).

Professor H. G. Greenish, Pharmaceutical Society.— A collection of miscellaneous drugs.

Director, Botanic Gardens, Singapore.—Thirty three specimens of Malayan timbers.

The Right Hon. the Earl of Yarborough, Brocklesby Park, Lincolnshire.—Two creosoted posts and four rails from a fence erected 17 years ago.

Mr. J. S. Gamble, East Liss, Hants.—Culms of *Neohouzeaua Helferi* Gamble, Burma.

Mr. A. C. Bartlett, Kew.—Sections of stems of *Elaeagnus* sp., *Prunus Pissardi* Carr, *Laburnum vulgare* J. S. Presl., and *Robinia Pseudacacia* L. var.

Curator, Royal Botanic Garden, Calcutta.—Seeds of *Holmskioldia sanguinea* Retz.

The New Liverpool Rubber Co., Ltd.—Examples of rubber-soled shoes.

Mrs. Vera Higgins, East Croydon.—Specimen of Jangada wood (*Apeiba Tibourbou* Aubl.).

Mr. F. Tracey, Colombia.—Fibre from leaves of "Cumare" palm (*Astrocaryum vulgare* Mart.), Orinoco region, Colombia.

Mr. G. F. Eeles, Anglemont, British Columbia.—Plant and fruits of Soapallaly (*Shepherdia canadensis* Nutt.) from British Columbia.

Curator, Botanic Gardens, Dominica.—Photographs of *Taraktogenos Kurzii* King and *Pouteria suavis* Hemsl. in Botanic Gardens, Dominica.

Revd. E. H. Goddard, Clyffe Vicarage, Swindon.—Ball of *Posidonia australis* Hook. f. from Adelaide.

Assistant Commissioner of Forestry for Scotland, Edinburgh.—Eight photographs of Forestry operations in Scotland.

Mr. J. W. Egerton, Sudbury.—Flower head and cone of *Banksia prionotes* Lindl., and carved Coconut shell.

Conservator of Forests, Sandakan, British North Borneo.—Sixty specimens of Borneo woods and six pamphlets upon Forestry subjects.

Miss T. Hicks, Derby.—Four photographs to illustrate the transplanting of a large tree.

Professor Percy Newberry.—Walking sticks, bow and throw stick from ancient tombs at Thebes.

Mr. H. M. O'Byrne, British Somaliland Protectorate.—Wood and bark of *Juniperus procera* Hochst.

Director of Agriculture, Zanzibar.—Root specimens of *Cassia Beareana* Holmes.

The Merchant Trading Co., Bishopsgate, London, E.C.—Plank of "Bagac" wood (*Dipterocarpus* sp.) from the Philippines.

Messrs. John Lenanton & Son, Ltd., Millwall, London.—Twelve sections of Malayan timbers.

Mr. W. Mathieson, Minchinhampton, Gloucester.—Photograph of a large Alder (*Alnus glutinosa* Medic.) growing at Shepscombe, Gloucester.

The Khartoum Museum, through Mr. R. E. Massey, Khartoum.—Fragment of cotton cloth from Egyptian tombs.

Research in Jodrell Laboratory in 1923.—Mr. L. A. Boodle made observations on the foliage of *Ampelopsis* seedlings, and carried out some experiments on the germination of pollen-grains and Fern-spores under different conditions.

Mr. R. N. Chrystal continued his studies on the life-history and feeding habits of the *Chermesidae* injurious to Silver Fir and Pine.

Mr. I. Namikawa was engaged in the completion of a research on the abscission of floral organs, dealing with the anatomy of the tissues of the separation layer, etc., and with the physiological processes concerned.

The Rev. L. D. Sayers began a study of the anatomy of species of *Chermes* and their galls.

Mr. A. Sharples carried out some work forming part of an investigation of organisms associated with Coconut bud-rot.

By arrangement with the Board of Education, a short course of instruction for Teachers in Secondary Schools was held at Kew from August 9–22. The course, attended by 40 teachers, was organised by Dr. Harold Wager, F.R.S., and included lectures, practical botanical work (accommodation being given in the Lecture Rooms adjoining the Jodrell Laboratory) demonstrations in the Gardens and Museums and visits to the Herbarium and Library.

Presentations to the Library during 1923.—The generous and most welcome offer of the Carnegie Institution of Washington to present to Kew such of its publications as were thought desirable in a botanical library has been followed by the receipt of several valuable books issued by the Institution during the last three years. These are:—*The Cactaceae*, by N. L. Britton & J. N. Rose, vol. iii. and vol. iv., pp. 1–80; *Plant habits and habitats in the arid portions of South Australia*, by W. A. Cannon; *Aeration and air-content: the rôle of oxygen in root activity*, by F. E. Clements; *Experimental pollination*, by F. E. Clements & F. L. Long; *The phylogenetic method in taxonomy*, by H. M. Hall & F. E. Clements; *Rubber-content of North American plants*, by H. M. Hall & F. L. Long; *The behaviour of stomata*, by J. V. G. Loftfield; *Studies in plant respiration and photosynthesis*, by H. A. Spoehr & J. M. McGee; and *Development and activities of roots of crop plants*, by J. E. Weaver, F. C. Jean & J. W. Crist.

Sir William Thiselton-Dyer has presented the following:—*Recueil d'Œuvres de Léo Errera*, 1908–22, 4 vols.; *Recueil d'Articles scientifiques dédié au Professeur Clément Timiriazeff par ses Élèves*, 1916 (in Russian, with summaries of the papers in German, French or English); *Emin Pasha: his life and work*, compiled by G. Schweitzer, 1898, 2 vols.; *Manuel technique de physiologie végétale*, by W. Detmer (French edition of 1890); *George, Duke of Cambridge: a memoir*, edited by E. Sheppard, 1906, 2 vols.; *Richmond on the Thames* (No. 27 of *The Portfolio*), by R. Garnett, 1896; *The Good Queen Charlotte*, by Percy Fitzgerald, 1899; *A Companion to Latin Studies*, edited by Sir J. E. Sandys, 3rd edition, 1921, containing an article on Flora (pp. 66–89), by Sir William; 5 pamphlets and several original letters.

The Trustees of the British Museum have presented the *Catalogue of the Books . . . in the British Museum (Natural History)*, Supplement, A–I, which forms vol. vi. of the work; *A Handbook to the larger British Fungi*, by J. Ramsbottom; and the Report on the Lichens of the British Antarctic ("Terra Nova") Expedition, 1910, by O. V. Darbishire.

From the Secretary of State for the Colonies have been received:—*Dates and date cultivation of the 'Iraq*, by V. H. W. Dowson, pt. 3; *The principal agricultural pests of Jamaica*, by C. C. Gowdey; and *Richard Schomburgk's Travels in British Guiana*, 1840–44, translated and edited by W. E. Roth, vol. i–ii, 1922–23.

The Secretary of State for India has presented *The English Factories in India*, 1661–64, by W. Foster; and the fifth part of *The Flora of the Presidency of Madras*, by J. S. Gamble. A second copy of the last named work has been presented by the author.

The presentations through the Crown Agents for the Colonies include:—*The forest officers' handbook of the Gold Coast, Ashanti and the Northern Territories*, by T. F. Chipp; *Gold Coast Hand-*

book, 1923; and Dr. E. O. Teale's Final Report of the Geological Survey of Tanganyika Territory, 1922.

Dr. N. L. Britton has continued to send to the library the *North American Flora*, of which four parts were received during the year, and other publications of the New York Botanical Garden.

A complete set of Hooker's *Flora of British India*, which formerly belonged to the late Mr. J. Ramsay Drummond, has been presented by his son, Mr. J. Montagu F. Drummond.

Presentations by Lieut.-Col. Sir David Prain include:—*Travaux du Laboratoire de Matière médicale de la Faculté de Pharmacie de Paris*, tome xiv.; *Webbia*, vol. v. pt. 1; and the year's issues of the *Proceedings of the American Philosophical Society*, *Bulletin de la Société botanique de France*, and *Berichte der Deutschen Botanischen Gesellschaft*.

Two contributions to a comparative study of the flora of the Scottish lakes, by G. West, 1905 & 1910, have been presented by Mr. N. E. Brown, also *Les Anthurium*, by E. Bergman, ed. 2, 1891, and *Experiments to show how failure under stress occurs in timber*, by A. R. Fulton, 1922.

Prof. Hans Schinz has presented the first part of the fourth edition of his and Prof. Keller's *Flora der Schweiz*, and a large collection of dissertations and other papers.

The following which, unless otherwise stated, were presented by their authors or editors and published in 1922 or 1923, have been received:—*Alberti Magni de vegetabilibus libri VII.*, ed. E. Meyer & C. Jessen, 1867, from the Bentham Trustees; Oakes Ames, *Schedulae Orchidianae*, Nos. 2–6; G. E. Anastasia, *Le forme elementari della composizione dei vegetali o l'origine della specie*, pt. 2; L. H. Bailey, *Gentes Herbarum*, vol. i. fasc. 2 & 3; W. F. Bewley, *Diseases of glasshouse plants*, from Messrs. Benn Brothers; J. M. Black, *Flora of South Australia*, pt. 1; J. Borg, *Cultivation and diseases of fruit trees in the Maltese Islands*; H. M. Bunbury, *The destructive distillation of wood*, from Messrs. Benn Brothers; C. de Candolle, *Piperacearum clavis analytica*, from Major-General R. de Candolle; L. Cockayne and others, *New Zealand Nature Notes*; W. Dallimore & A. B. Jackson, *Handbook of Coniferae including Ginkgoaceae*, from Mr. W. Dallimore; R. Descharmes, *Bibliographie des travaux scientifiques publiés par les sociétés savantes de la France*, tome ii., 1re livraison, from Ministère de l'Instruction publique, Paris; G. B. De Toni & A. Forti, *Alghe di Australia, Tasmania e Nuova Zelanda, raccolte dal Rev. Dott. G. Capra nel* 1908–1909, from Mr. A. D. Cotton; L. Diels, *Beiträge zur Kenntnis der Vegetation und Flora der Seychellen* (Valdivia Expedition); H. B. Dobbie, *New Zealand Ferns*, ed. 2, 1921, from the Editor of *Nature*; G. Forrest, *Details of specimens of Rhododendron found . . . in* 1922, from Mr. J. C. Williams; P. F. Fyson, *The Indian species of Eriocaulon*, 1921–23; N. T. Giung, *Contribution à l'étude anatomique des téguments séminaux des Légumineuses exotiques*; D. F. de S.

Gunerathne, *List of Plants in the Henaratgoda Botanic Gardens, Gampaha, Ceylon*, from the Director of Agriculture, Ceylon; U. P. Hedrick, *The Pears of New York*, 1921; E. Janchen, *Die in Deutschland und Österreich an wissenschaftlichen Anstalten wirkenden Botaniker*, from Dr. Otto Stapf; H. O. Juel, *Studien in Burser's Hortus siccus*; H. Knoche, *Flora Balearica*, vol. iii. & iv.; S. H. Koorders, *Supplement op het Eerste Overzicht der Flora van N.O. Celebes*, Deel ii. & iii., uitgegeven door . . . A. Koorders-Schumacher; J. H. Lace, *List of trees, etc. recorded from Burma*, ed. 2, revised by G. Rodger; T. S. Lindsay, *Plant names*, from the Sheldon Press; C. von Linné, *Bref och Skrifvelser af och till Carl von Linné*, Afdeln. 1, del viii. utgifna . . . af J. M. Hulth, from the Royal University of Upsala; J. H. Maiden, *Critical Revision of the genus Eucalyptus*, pts. 57–60; J. H. Maiden, *Forest Flora of New South Wales*, pts. 71–74, from the Secretary for Agriculture, Sydney; U. Martelli, *Webbia*, vol. v. pt. 2; *Menzies' Journal of Vancouver's Voyage, April to October*, 1792, edited by C. F. Newcombe; E. D. Merrill, *Enumeration of Philippine Flowering Plants*, 11 fascicles; C. F. Millspaugh & L. W. Nuttall, *Flora of Santa Catalina Island, California*, 2 copies, from the Field Museum, Chicago; K. Miyabe & Y. Kudo, *Icones of the essential forest trees of Hokkaido*, fasc. 7–9, from the Governor of Hokkaido; M. Miyoshi, *The plant world of Japan*, 1910, from Dr. Otto Stapf; J. J. Nock, *List of Plants in the Botanic Gardens, Hakgala, Ceylon*, from the Director of Agriculture, Ceylon; W. Nowell, *Diseases of Crop Plants in the Lesser Antilles*; Alice M. Ottley, *Revision of the Californian species of Lotus*; C. E. Parkinson, *Forest Flora of the Andaman Islands*; P. Vanpruk Picharn, *List of common trees, &c. in Siam*, from the Royal Forest Department of Siam; S. J. Record, *Bibliography of the woods of the world*, ed. 2; H. N. Ridley, *Flora of the Malay Peninsula*, vol. i. & ii., from the Government of the Straits Settlements and F.M.S.; J. Roscoe, *Twenty-five years in East Africa*, 1921, from Mr. J. Burtt Davy; Principe Sant' Antimo, *Le Palme di Villa Lucia*, 1920; E. Graf Silva Tarouca & C. Schneider, *Unsere Freiland-Laubhölzer*, ed. 2, and *Unsere Freiland-Nadelhölzer*, ed. 3, both from Mr. W. J. Bean; J. B. Stevenson, *Rhododendrons found by F. Kingdon Ward*, 1913–22; H. Stone, *Text-book of wood*, 1921; C. Vermoesen, *Manuel des essences forestières du Congo belge*, from Directeur Général de l'Agriculture au Ministère des Colonies, Brussels; J. Levêque de Vilmorin, *L'hérédité chez la Betterave cultivée*; C. T. White, *An elementary text-book of Australian forest botany*, from the Forestry Commission of New South Wales; E. H. Wilding, *Rhododendrons: their names and addresses*; R. C. Wren, *Potter's Cyclopaedia of botanical drugs and preparations*, ed. 3, from Messrs. Potter & Clarke.

Of societies, academies and other institutions which have sent their publications to Kew during the year, and which have not been already mentioned, the following are the more important:— Royal Swedish Academy of Sciences; Danish Botanical Society;

Czechoslovak Botanical Society of Prague; Department of Agriculture of the Union of South Africa; Agricultural Research Institute, Pusa; Indian Tea Association, Calcutta; Department of Agriculture, Buitenzorg; Bureaus of Science, Agriculture and Forestry, Philippine Islands; Smithsonian Institution, Washington; U.S. Department of Agriculture; Arnold Arboretum; Missouri Botanical Garden; California Academy of Sciences and University of California. The following have also been received as presentations :—*Acta Horti Bergiani*, tom. vii., from Prof. R. E. Fries; *Bothalia*, vol. i. pt. 3, from Dr. I. B. Pole Evans; *British Guiana Handbook*, 1922, from the Committee of Correspondence, &c., R. Agric. Soc., British Guiana; *Bulletins of the Agricultural Department, Nigeria*, from the Director of Agriculture; *Japanese Journal of Botany*, from the National Research Council of Japan; *Mededeelingen van het Proefstation voor Thee*, Buitenzorg (21 numbers) and *De Thee* (4 vols.), from Director of the Station; *Official Year-Book of the Union of South Africa*, 1922, from the High Commissioner; *Orchid Review*, from the Editor, Mr. Gurney Wilson; *Report of the British Association for the Advancement of Science*, 1922, from Miss E. M. Wakefield; *Report of the Lands and Forests Department, Sierra Leone*, 1922, from Mr. M. T. Dawe; and *A Census of the Plants of Victoria*, from the Field Naturalists' Club of Victoria, Australia.

Very numerous excerpts from journals and other publications, and dissertations, have been received. The principal contributors of these were :—Mr. Oakes Ames, Prof. P. A. van der Bijl, Dr. V. F. Brotherus, Dr. P. Brühl, M. H. Chermezon, Prof. R. Chodat, Dr. E. De Wildeman, Prof. L. Diels, Mr. Carlos França, Mr. Th. C. E. Fries, Dr. H. Faes, Miss C. C. Haynes, Dr. K. Keissler, Mr. C. C. Lacaita, Prof. K. Linsbauer, Dr. R. Maire, Mr. C. V. B. Marquand, Prof. E. D. Merrill, Prof. T. G. B. Osborn, Dr. C. H. Ostenfeld, Dr. R. Pilger, Mr. G. Samuelsson, Prof. Hans Schinz, M. J. Thériot, Prof. René Viguier, Dr. Jan Vilhelm, Miss E. M. Wakefield, Director of the Botanic Gardens, Utrecht, Government Botanist of Victoria, Australia, and Chief of the Department of Pathology of the Agricultural College, Ithaca, New York.

Mr. W. F. Wilson of Honolulu has presented the December (1922) issue of *Paradise of the Pacific: Hawaii's Illustrated Magazine*, and an album of 55 excellent photographs of views and plants of Ceylon has been received from Mr. R. Oldham.

Colonel W. G. King's gift of a further collection of original paintings of Burmese plants, by the late Mrs. King, was the subject of a note in the *Kew Bulletin*, 1923, p. 404. A set of plates from *Flowering Plants of South Africa* has been presented by Dr. I. B. Pole Evans, and figures from the *Flora of the Malay Peninsula* have been presented by Mr. Ridley.

Report of the Herbarium, 1923. During the year 1923 the permanent staff was restored to pre war strength. This enabled certain branches of work again definitely to be taken in hand.

Very heavy arrears existed, however, in practically all departments, and it was felt necessary to continue the special effort made last year to deal with some of these, notably with the large collections in the store-house. The earlier stage of such work, namely, the general sorting out, and the distribution of duplicate numbers, was therefore continued, and in the case of the following herbaria completed:—E. André (Colombia), J. R. Drummond (India), R. C. A. Prior (parts of Europe and the Orient and America), J. Cavalerie (China), W. Hancock (China). The later stage—that of determination—was pushed forward, especially with regard to the first three of the above-mentioned collections. Several smaller collections were also dealt with. As a result of this effort a very large number of sheets were named and "laid in", and over 20,000 specimens were distributed as duplicates.

The number of specimens acquired by purchase and exchange during 1923 fell far short of that of the previous year (allowing even for the large herbarium of the late J. R. Drummond presented in 1922). The reduction in number was relatively much greater in the collections obtained by purchase.

With the vacancies in the staff filled it was again possible to allot an assistant to deal specially with the flora of Australia, and collections sent from the Commonwealth can now be dealt with promptly. Another assistant is devoting practically his whole time to the flora of China, and the work of naming the very large and valuable collections of Chinese plants accommodated in the store-house is being accelerated. With the post of Assistant for South Africa still vacant the task of determining continuous supplies from the various parts of the Union is exceptionally arduous.

As naming and "laying in" are largely only a means to an end, it is gratifying to record that, in spite of this heavy tax on the staff, the more important constructive work, such as the preparation of monographs and the writing of floras, was continued. The most important departure was the commencement on September 1st of a Flora of West Africa for use in the various West African Colonies, and in this connection the extensive collections of Mr. N. W. Thomas of Sierra Leone were taken in hand.

South Africa was not neglected, and, owing largely to the presence of several South African botanists engaged in floristic research on various parts of the Union, much useful work was accomplished, members of the staff being able to afford material assistance to several of these workers. Central America also received attention, and a critical list of the plants of British Honduras (preparatory to the publication of a Flora) was commenced. Interest in the Balkan Peninsula has been quickened as a result of military operations during the War, and many collections by Army officers and others have been received. A comprehensive work on the plants of this very interesting region is in progress. A number of systematic revisions of genera were prepared by various members of the staff, several of which have been published in the Kew Bulletin.

Of visitors occupied in the preparation of floras and spending the entire year at Kew in examining material mention may be made of the following :—Mr. H. N. Ridley (Flora of the Malay Peninsula). Mr. J. Burtt Davy(Flora of the Transvaal). Mr. L. A. M. Riley (Flora of Sinaloa, Mexico). Mr. J. S. Gamble and Mr. H. H. Haines, who are completing their Floras of the Madras Presidency and Bihar and Orissa respectively, made numerous visits to the Herbarium. Miss S. Garabedian of the South African Museum has throughout the year been studying the flora of South-West Africa, and Mr. N. S. Pillans of the Bolus Herbarium, Cape Town, spent five months at Kew preparing a revision of the South African species of *Restiaceae*. Professor C. E. Moss of the University of the Witwaters Rand also spent several weeks in the Herbarium studying particularly the flora of the Johannesburg region. A revision of the genus *Sphaeranthus* was prepared by Dr. W. Robyns of the University of Louvain, Belgium, and Miss J. Davison of the Division of Botany, Pretoria, completed a revision of the South African species of *Celastraceae*.

On the cryptogamic side the identification of tropical fungi claimed first attention, those of India and Africa being the most important. With a view to the publication of an additional list of Uganda fungi efforts have been concentrated as far as possible on the fungi of this Protectorate, and most of the Uganda collections now to hand have been named. Mr. C. G. Lloyd of the Lloyd Library, Cincinnati, has been in the Herbarium nearly the whole year engaged in his work of a revision of the *Pyrenomycetes*, and Professor S. Ito of the University of Hokkaido, Japan, stayed for a period of several months studying Japanese fungi with a view to the publication of a new list.

Special attention was given to the preparation of Supplements VI. and VII. of the Index Kewensis in order to make up arrears due to the partial suspension of the work of compilation during the War, and very satisfactory progress has been made. Particular care has been taken to detect and incorporate omissions from previous supplements.

The compilation of the new edition of Pritzel's Index Iconum has been continued, under Dr. Stapf's direction, by the staff employed by the Royal Horticultural Society; and Dr. Stapf himself has continued his work in the Herbarium as editor of the Botanical Magazine.

COLLECTIONS RECEIVED AND DEALT WITH IN 1923.—The number of specimens received is shown in the following table :

Collections purchased - - - - - -	2,571
Collections received as donations or in exchange - - - - - - -	18,317
Specimens received in small numbers [namebook entries] - - - - - -	2,891
Specimens for examination received on loan	1,896

The routine work of the year, which shows a marked increase over the amount of work carried out in 1922, may be summarised as under :—

Specimens laid out and prepared for mounting	25,760
Specimens mounted - - - - - -	28,927
Named specimens incorporated in the Herbarium - - - - - - - -	30,305
Specimens distributed as duplicates - -	23,581

The principal collections received are as follows :—

Europe.—*Presented :* Britain ; Cornwall, by Mr. Edgar Thurston ; various localities, by the Watson Botanical Exchange Club (per Mr. J. E. Little) and Mrs. G. Lloyd ; British Marine Algae (coll. L. W. Dillwyn), by Mrs. T. Story Maskelyne ; Iceland, Vigholl, Thufra River, by Mr. St. G. Littledale ; France, duplicates from Lenormand's herbarium, by the University of Caen (per Prof. René Viguier) ; Pyrenees, by Messrs. J. Hutchinson, J. R. Matthews and L. A. M. Riley ; Spain (coll. F. Sennen and others), by Prince R. Bonaparte ; Corsica, by the late Dr. C. J. Forsyth Major ; Bulgaria, Varna District, by Mr. B. Gilliat-Smith ; Gallipoli (Thrace), by Capt. C. M. Ingoldby and by Mr. R. Kett ; Balkan Peninsula, various localities, by Mr. W. B. Turrill.

Purchased : D. McArdle, Irish Bryophyta ; H. Sydow, Mycotheca Germanica, fasc. 37–41 ; Dr. W. Migula, Characeae.

Orient.—*Presented :* Syria (coll. B. T. Lowne), by Mr. C. E. Salmon.

North Africa.—*Presented :* Algeria (coll. Ch. d'Alleizetti), by the Univerity of Caen (per Prof. René Viguier).

Atlantic Islands.—*Presented :* Madeira and Teneriffe (coll. J. Forbes), by Mr. C. E. Salmon.

China.—*Presented :* Chihli, by Mr. H. N. Cowdry ; Honan, by J. Hers ; Chinese Rhododendrons, by the Royal Botanic Garden, Edinburgh.

India.—*Presented :* Kashmir, by Mr. B. O. Coventry ; Burma, by Mr. C. E. C. Fischer and Col. W. G. King ; Dehra Dun, Almora District, by Mr. R. N. Parker.

Purchased : Rev. G. Foreau, Pulney Hills.

Malay Peninsula.—*Presented :* Various localities, by Mr. I. H. Burkill.

Malaya.—*Presented :* Siam, by Dr. A. F. G. Kerr, Mrs. D. J. Collins and the Siamese Forestry Service ; Fungi Malayani, cent. 1 and 3 (coll. C. F. Baker), by Prof. W. T. Horne ; Java, by the Director, Botanic Gardens, Buitenzorg ; Philippine Islands, by the Director, Philippine Bureau of Science ; New Guinea (coll. R. Schlechter), by Prince R. Bonaparte ; New Guinea (coll. Lederman), by the Dahlem Botanic Garden.

Australia.—*Presented :* Victoria (coll. 1860, R. J. Kendall), by the Royal Geographical Society; Grampian Mountains, by Mr. J. W. Andas.

Polynesia.—*Presented :* Fiji, by Mr. W. Greenwood.

New Zealand.—*Presented :* by Dr. L. Cockayne.

Tropical Africa.—*Presented :* Sierra Leone, by Mr. M. T. Dawe; Gold Coast, by the Gold Coast Forestry Department; Nigeria, by Mr. H. V. Lely; Angola, by Mr. J. Gossweiler; South West Africa (coll. K. Dinter), by the South African Museum; Belgian Congo (coll. F. M. C. Vermoesen), by the Jardin Botanique de l'État, Brussels; Uganda, by Mr. T. D. Maitland; Kenya Colony, by the Nairobi Forestry Department and Mrs. L. M. Langridge; Rhodesia (coll. F. Eyles), by the Bolus Herbarium.

Purchased : R. A. Dümmer, Uganda.

Madagascar.—*Presented :* by Mons. H. Perrier de la Bâthie.

South Africa.—*Presented :* Transvaal, by Mr. J. Burtt Davy and the Transvaal Museum, Pretoria; Bloemfontein, by Dr. G. Potts; various localities, by the Division of Botany, Pretoria, the South African Museum, Cape Town, and the Rev. F. A. Rogers.

North America.—*Presented :* Montana and New Hampshire, by Mrs. S. D. McKelvey; California, by Prof. W. C. Blasdale; Santa Catalina Island (coll. E. C. Knopf and L. W. Nuttall), by the Field Museum, Chicago; various localities, by Prof. C. S. Sargent.

Purchased : A. H. Brinkman, Alberta.

West Indies.—*Presented :* Trinidad (coll. F. J. Seaver), by Dr. N. L. Britton.

South America.—*Presented :* Venezuela, Caracas, by Mr. A. G. Bailey; British Guiana, by the Forestry Department, and (coll. Dr. H. A. Gleason) by Dr. N. L. Britton; Brazil (collected during the Mulford Biological Exploration of the Amazon Basin), by Dr. H. H. Rusby; Uruguay, by Dom M. B. Berro.

General.—*Purchased :* H. Sydow, Fungi Exotici Exsiccati, fasc. 10–11; P. Sydow, Uredineen, fasc. 52–57, Ustilagineen, fasc. 13, and Phycomyceten, fasc. 9; Naturhistorischen Museum, Vienna, Kryptogamae Exsiccatae, cent. 27.

Notes on the Collections.—Mr. Edgar Thurston, C.I.E., presented additional plants found by him in Cornwall in 1922, and during a visit to Kew incorporated them with his Cornish Herbarium. The British Herbarium formed by Dr. Geo. Lloyd between 1825 and 1843, containing some specimens collected by Sir William Hooker, has been presented, through the good offices of the Bournemouth Natural History Society, by his widow, as recorded in the *Kew Bulletin*, 1923, p. 189. Mrs. T. Story Maskelyne has presented 390 Algae from the herbarium of L. W. Dillwyn and also some fascicles prepared to illustrate his "British Confervae", which was published 1802–7. The same donor has also given 20 of Dillwyn's drawings of mosses. Various interesting British plants have been received from the Watson Botanical Exchange Club. Messrs. J. Hutchinson, J. R. Matthews and L. A. M. Riley have presented the first set of specimens collected by them during a tour in the Pyrenees. A large collection of Corsican plants was presented by Dr. C. J. Forsyth Major shortly before his death; his collections from Madagascar were received several years ago.

Mr. C. E. Salmon has presented additional Syrian specimens collected by B. T. Lowne, and others from Madeira and Teneriffe collected by J. Forbes and preserved in the herbarium of the late A. W. Bennett. Mr. H. N. Cowdry has sent specimens from the Chihli Province of China. A valuable set of 250 co-types of Rhododendron has been presented by the Royal Botanic Garden, Edinburgh.

Burmese plants have been received from Mr. C. E. C. Fischer, Conservator of Forests, and Col. W. G. King, I.M.S., C.I.E. Mr. B. O. Coventry has presented two interesting collections from Kashmir.

Mr. I. H. Burkill has sent collections made in various parts of the Malay Peninsula by Mr. R. E. Holttum and others. Dr. A. F. G. Kerr has continued to make extensive collections in Siam, and has also forwarded specimens from Mrs. D. J. Collins. New Guinea has been represented by Lederman's specimens, presented by the Dahlem Botanic Garden, and by Dr. R. Schlechter's, presented by Prince Roland Bonaparte.

From Australia, in addition to smaller consignments, a collection made in the Grampian Mountains, Victoria, by J. W. Andas has been received from the National Herbarium, Melbourne.

Mr. W. Greenwood has continued his work on the flora of Fiji and forwarded his specimens to Kew. Dr. L. Cockayne has sent New Zealand plants, including many specimens of *Nothofagus*, the forms of which he has been specially investigating.

Tropical Africa has not yielded such an abundance of specimens as in former years, but a greater proportion has been received from the various Forestry Departments, as noted above.

M. H. Perrier de la Bâthie has presented specimens collected by him in Madagascar, and others from the same source have been received through the University of Caen.

Numerous Transvaal specimens have been presented by the Division of Botany, Pretoria, and Mr. J. Burtt Davy. The donation from the South African Museum, Cape Town, contained many specimens of Mesembryanthemum. The Rev. F. A. Rogers has continued to present specimens from his African herbarium.

Prof. C. S. Sargent has presented North American specimens, some of them from plants grown in the Arnold Arboretum. A collection made in Santa Catalina Island, California, by E. C. Knopf and L. W. Nuttall, has been received from the Field Museum, Chicago: an account of the botany of this island was published by the late Dr. C. F. Millspaugh.

Trinidad plants collected by Mr. F. J. Seaver and those collected in British Guiana by Dr. H. A. Gleason have been received from the New York Botanical Garden. Mr. A. G. Bailey has forwarded the collection made by him during a trip to Caracas, Venezuela. The specimens collected during the Mulford Biological Exploration of the Amazon Basin have been presented by Dr. H. H. Rusby. Plants from Uruguay have been bequeathed by the late Dom M. B. Berro.

VISITORS.—About 5,205 visits have been made to the herbarium during the year. Amongst those who have paid frequent visits or made a prolonged stay may be mentioned :—Mr. E. G. Baker, British Museum (African and New Caledonian plants); Mr. H. R. Britton-Jones (Pathology); Mr. and Mrs. A. F. Broun (Sudan plants); Mr. N. E. Brown (South African and South American plants); Prof. A. H. R. Buller, Winnipeg (Fungi); Mr. I. H. Burkill, Singapore (Dioscoreaceae and Malay Peninsula plants); Dr. J. M. Dalziel (Nigerian Flora); Mr. and Mrs. J. Burtt Davy (Transvaal plants); Miss M. E. J. Chandler (fossil fruits and seeds); Dr. A. Daniker, Zürich (Ecology); Miss H. Joan Davison (South African Celastraceae); Mr. H. N. Dixon (Musci); Mrs. E. O. Durham (translation of Lehmann's Colombian notes); Dr. F. Evrard, Saigon (Flora of Cochin-China); Mr. W. Fawcett (West Indian plants); Mr. J. S. Gamble (Flora of Madras); Miss S. Garabedian, South African Museum (South African plants); Mr. B. Gilliat-Smith (Bulgarian plants); Mr. W. B. Grove (Fungi); Mr. H. H. Haines (Flora of Bihar and Orissa); Mr. L. Hall (Plant Chemistry); Prof. A. Henry, Dublin (Coniferae, etc.); Capt. and Mrs. Ingoldby (Thracian plants); Prof. B. Issatchenko, Petrograd (Library); Mr. A. B. Jackson, Imperial Institute (Coniferae); Mr. H. C. Javaraya, Bangalore (Indian plants); Miss M. C. Karsten, Amsterdam (Succulent plants); Mr. A. Keuchenius, Java (Thea); Mr. C. C. Lacaita (European and Oriental plants); Mr. C. G. Lloyd, Cincinnati (Fungi); Mr. E. W. Mason, Imperial Bureau of Mycology (Fungi); Mr. J. P. Mead, Sarawak (Dipterocarpaceae); Mr. Spencer Moore (Australian plants); Prof. C. E. Moss, Johannesburg (South African Monocotyledones); Mr. I. Namikawa (Japanese plants); Mr. R. Paulson (Lichenes); Mr. N. S. Pillans, Bolus Herbarium (South African Restiaceae); Mr. O. Posthumus, Groningen (Malayan Filices); Dr. R. Lloyd Praeger, Dublin (Sempervivum); Mrs. E. M. Reid (fossil fruits and seeds); Mr. H. N. Ridley (Flora of the Malay Peninsula); Mr. L. A. M. Riley (Flora of Sinaloa); Dr. W. Robyns, Louvain (Sphaeranthus); Rev. F. A. Rogers (Rhodesian plants); Dr. C. L. Shear, Washington (Fungi); Miss L. Snelling (Botanical Magazine); Prof. R. R. Stewart, Rawalpindi (Flora of Kashmir); Mr. Herbert Stone (Library); Prof. Seiya Ito, Sapporo (Japanese

Fungi): Mr. Edgar Thurston (Cornish plants); Mr. C. B. Ussher (tropical agriculture).

On October the 24th the Prime Minister of the Union of South Africa, Gen. J. C. Smuts, visited the Herbarium.

A New Book on Coniferae.*—This work has appeared very opportunely. At the present time a deep and widespread interest is being taken in conifers, yet all the authoritative books at the disposal of students of the family are now very much out of date.

All the introduced species are fully and adequately described in language that can be understood by anyone reasonably well educated in English, without having more than occasional recourse to a dictionary of botanical terms. Nor does this detract in any way from its scientific value, although no doubt it loses something in conciseness. Besides being a descriptive work it attempts a much more difficult and ambitious task, namely, that of enabling the student by means of a system of keys based very largely on vegetative characters to identify the genus and species to which any cultivated conifer belongs.

Whilst a large part of the book is taken up by descriptive and comparative matter a full account is also given of the history, origin and aesthetic or economic value of each species. Abundant cultural information is afforded and the subject of insect and fungus pests, with such remedial measures as are possible, is fully discussed.

Besides the drawings by Miss Lister, the book is illustrated by thirty-two full page plates. It is excellently printed in clear type and well indexed. The arrangement is alphabetical, but it would have been an improvement if the right-hand page had been headed by the name of the genus in process of being dealt with there, instead of "Taxaceae" or "Pinaceae" as at present runs through the whole book.

It would be an ungrateful task to search for and point out minor errors such as are inevitable in a book of this size and class, but as it is a matter which pertains particularly to Kew, we may point out that the date of the introduction of the Ginkgo is wrongly given as 1795. The fine tree which stands near the Conservatory was introduced, according to John Smith in his "Records of Kew", in 1754. It is probably the oldest Maidenhair Tree in the country whose introduction is recorded.

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* A Handbook of Coniferae. By W. Dallimore and A. Bruce Jackson, A.L.S. London: Edwin Arnold & Co. Price, 42*s*.

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ROYAL BOTANIC GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

No. 2] [1924

IV.—CONTRIBUTIONS TOWARDS A PHYLOGENETIC CLASSIFICATION OF FLOWERING PLANTS : III.*

J. Hutchinson.

The Genera of Gymnosperms.

The following families of Gymnosperms are now generally recognised : 1. **Cycadaceae,** 2. **Ginkgoaceae,** 3. **Taxaceae,** 4. **Pinaceae,** 5. **Gnetaceae.** This contribution provides keys to the genera of *Cycadaceae* (below), *Taxaceae* (p. 53) and *Pinaceae* (p. 57), and a map showing the distribution of the three genera of *Gnetaceae* (p. 66), i.e. *Ephedra*, *Gnetum* and *Welwitschia*. The family *Ginkgoaceae*, formerly included in the *Taxaceae*, is represented by the single genus and species *Ginkgo biloba*. From a purely morphological point of view *Ginkgo* finds its true affinities in the *Taxaceae*, but chiefly on account of its ancient fern-like character, the motile antherozoids, it is separated as a family. Extensive bibliographies on *Ginkgo* will be found in the following : Seward, " The Maidenhair Tree (*Ginkgo biloba*) " in Annals of Botany 14 : 109–154 (1900) ; Seward, Fossil Plants 4 : 1–105 (1919).

CYCADACEAE.

Key to the Tribes and Genera.

Tribe I. Cycadeae. Leaf-segments circinately involute in bud ; pinnae with a central midrib but no lateral nerves. Female sporophylls borne separately like foliage-leaves and not in cones (the central axis continuing to grow after flowering), pectinate in the upper part, bearing on their lower margins 2 or more ovules ; ovules ascending - - - - 1. **Cycas.**

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* Continued from *K.B.*, 1923, p. 261.

(17982.) Wt. 396. P. 32. 1000. 3/24. Wy. & S., Ltd. Gp. 50. (4.)

Tribe II. ENCEPHALARTEAE. Leaf-segments straight in bud, imbricate. Female sporophylls scale-like and forming cones which fall off after flowering; scales peltate, bearing one inverted ovule on each side.

Subtribe 1. *Encephalartineae.* Cone-scales imbricate in an alternating series. Trunk cylindric or ovoid, covered with the persistent bases of the leaves and prophylls. Leaf-segments with longitudinally parallel nerves.

- Leaves deeply pinnatisect, with pungent segments; cone-scales lax, shortly stipitate, flat, erect, ovate, cordate; ovules inserted on a hook-like process on each side of the stalk; Mexico - - - - - 2. **Dioon.**
- Leaves pinnate; Africa and Australia:
  - Female cone-scales with a thickened and ascending peltate limb, often produced into an acuminate spine-like blade; Australia - - - - - 3. **Macrozamia.**
  - Female cone-scales with a peltate, thickened, more or less truncate, decurved limb: Africa 4. **Encephalartos.**

Subtribe 2. *Stangerineae.* Cone-scales as in previous subtribe. Trunk rhizomatous or turnip-like, nude. Leaf-segments with a midrib and numerous lateral nerves at right angles 5. **Stangeria.**

Subtribe 3. *Zamineae.* Cone-scales superposed in vertical series. Scales hexagonous and valvate. Leaf-segments as in subtribe *Encephalartineae.*

- Leaves bipinnate; stem nude, underground: N. Australia - - 6. **Bowenia.**
- Leaves pinnate; America:
  - Male and female cone-scales 2-horned - - - - - 7. **Ceratozamia.**
  - Male and female cone-scales not horned:
    - Trunk cylindric, covered with persistent leaf-bases and prophylls; cone-scales woolly-tomentose - - - - 8. **Microcycas.**
    - Trunk sometimes partly below the soil, nude; cone-scales not hairy - - - 9. **Zamia.**

Tribe I.—CYCADEAE.

1. **Cycas** *Linn.*—30 spp., Tropics and Subtropics of Old World ; type sp.* *C. circinalis*, Ceylon and S. India.

Tribe II.—ENCEPHALARTEAE.

2. **Dioon** *Lindl.*—2 spp., Mexico ; type sp. *D. edule.*
3. **Macrozamia** *Miq.*—14 spp., Tropical and Subtropical N.E. Australia ; type sp. *M. spiralis.*—Benth. Fl. Austral. 6 : 250. C. Moore in Journ. Roy. Soc. N. S. Wales, 1884 : 115—122.
4. **Encephalartos** *Lehm.*—18 spp., Tropical and South-East Africa.—Prain, Fl. Trop. Afr. 6 : 2 : 347.
5. **Stangeria** *T. Moore.*—3 spp., S.E. Africa ; type sp. *S. paradoxa*, Natal.
6. **Bowenia** *Hook.*—2 spp., N.E. Queensland ; type sp. *B. spectabilis.*—Benth. Fl. Austral. 6 : 254.
7. **Ceratozamia** *Brongn.*—4 spp., Mexico ; type sp. *C. mexicana.*
8. **Microcycas** *Miq.*—1 sp., *M. calocoma*, Cuba.
9. **Zamia** *Linn.*—35 spp., Florida and West Indies to Brazil and Peru ; type sp. *Z. floridanum*, Florida.

GEOGRAPHICAL DISTRIBUTION.

Five genera of *Cycadaceae* are confined to the Old World and four to the New, and they are never far removed from the tropics or subtropics. Two of the Old World genera, *Macrozamia* and *Bowenia*, are confined to Eastern Australia ; two of the others, *Encephalartos* and *Stangeria*, to Equatorial and South Africa respectively, whilst the remaining genus, *Cycas*, which is without doubt the most primitive, is more widely distributed than any other genus of Cycads, extending (see map) from Madagascar, the Comoro Islands and Tropical East Africa to South India, Japan, Philippines, Australia and Polynesia. Of the American genera, *Microcycas* is not known to occur outside the island of Cuba, *Dioon* and *Ceratozamia* are confined to Mexico, whilst *Zamia*, the largest genus, extends from Florida to Peru. The occurrence of two species of *Zamia* in Florida seems in keeping with the general antiquity of the plant life of that peculiar peninsula.

The family *Cycadaceae* is no doubt decreasing rapidly, partly due to natural decline, and partly to the more extended cultivation of land in the tropics, so that the time may not be so very far distant when most of the species will have entirely disappeared. Only in the case of a very few species do Cycads grow together in any quantity. One exception is *Macrozamia spiralis*, which has a geographical range of nearly 300 miles along the coast of New South Wales, from Port Macquarie to the borders of Victoria. Frequently it occurs in great abundance and massed together, in some parts occupying large areas almost exclusively, growing in a poor stiff ironstone-clay soil. The fine soft woolly hairs of the upper portion of the stem of this species are used in some parts of New South Wales for stuffing beds.

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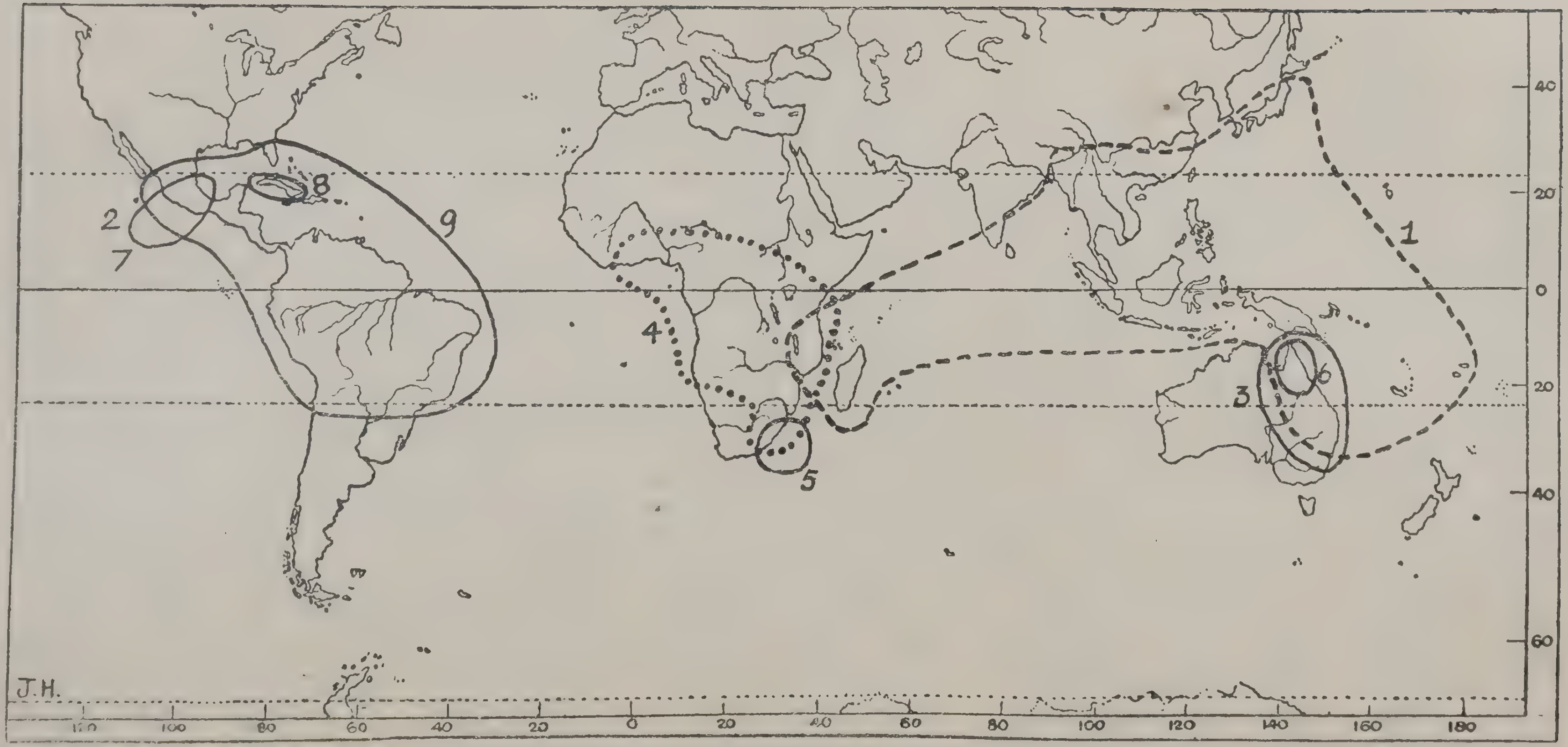
* In this paper I have continued to give the type species of the genera, with a few exceptions. In some genera the selection of the type species is a simple matter, but in many, especially Linnean, the question will often remain a matter of opinion.



Distribution of the genera of CYCADACEAE.

1. CYCAS. 2. DIOON. 3. MACROZAMIA. 4. ENCEPHALARTOS. 5. STANGERIA. 6. BOWENIA. 7. CERATOZAMIA. 8. MICROCYCAS. 9. ZAMIA.

TAXACEAE.

Key to the Tribes and Genera.

Tribe I. Taxeae. Seeds partially or completely surrounded by an aril or with a fleshy resinous outer testa; anther-cells 2–8; pollen grains wingless.

  Seeds partially or wholly invested by an aril; ovule solitary:

    Stamens in a subsessile or stipitate cluster surrounded by bracts at the base; male flowers not in catkins; Northern Hemisphere (and Sumatra):

      Seeds partially invested by a thick, fleshy, cupular, coloured aril; stamens supported on a stipe - - - - - - 1. **Taxus.**

      Seeds completely invested by a thin aril which becomes confluent with the woody testa; stamens in a subsessile cluster 2. **Torreya.**

    Stamens in the axils of bracts arranged in short dense spikes; seeds completely invested by an aril; New Caledonia - - - 3. **Austrotaxus.**

  Seeds without an aril, but the outer testa fleshy; male flowers in axillary clusters; anther-cells usually 3; ovules in terminal spikes or heads - 4. **Cephalotaxus.**

  Seeds ?; male flowers in slender pendulous catkins; ovule solitary in the axil of a bract at the apex of the branchlet; imperfectly known Chinese genus - - - - 5. **Amentotaxus.**

Tribe II. Podocarpeae. Seeds with a dry testa; ovules erect or inverted; ovuliferous scale usually present, sometimes adnate to the integument of the ovule; anther-cells 2; pollen grains usually winged; leaves various.

  *Branches never leaf-like:

    Ovule erect or at length erect, the micropyle abaxial:

      Ovuliferous scale absent, the ovule inserted directly on the carpellary scale; leaves triangular, small and imbricate - 6. **Phaerosphaera.**

      Ovuliferous scale present:

        Micropyle subbasal - - 7. **Dacrydium.**

        Micropyle subapical - - 8. **Acmopyle.**

Ovule remaining inverted with the micropyle adaxial :

Sterile bracts at length fleshy and concrescent into a " receptacle " ; ovuliferous scale closely investing and adnate to the seed - - 9. **Podocarpus.**

Sterile bracts not fleshy or concrescent ; ovuliferous scale free from the seed coat :

Leaves linear, laxly arranged - 10. **Saxegothaea.**

Leaves short and triangular, imbricate - - - - 11. **Microcachrys.**

Branches flattened and leaf-like, bearing scale-leaves and flowers on their margins ; ovule erect - - 12. **Phyllocladus.

Excluded genus.—*Polypodiopsis* Carrière, Traité Général des Conifères, ed. 2. 710 (1867), is most likely a Proteaceous plant, and very probably *Bauprea Balansae* Brongn. & Gris. (see *Kew Bull*, 1920, 372).

Tribe I.—Taxeae.

1. **Taxus** *Linn.*—7 spp., N. Temperate Zone ; type sp. *T. baccata*, Europe to N. Persia, Algeria, Azores.
2. **Torreya** *Arn.* (*Tumion* Raf.).—5 spp., Eastern Asia, S. Unit. States ; type sp. *T. taxifolia*, Florida.
3. **Austrotaxus** *Compton* in Journ. Linn. Soc. 45 : 427, pl. 26 (1922).—1 sp., *A. spicata*, New Caledonia.
4. **Cephalotaxus** *Sieb.* & *Zucc.*—6 spp., Eastern India to Japan: type sp. *C. drupacea*, W. China to Japan.
5. **Amentotaxus** *Pilger* in Engl. Bot. Jahrb. 54 : 41 (1916).—1 sp., *A. argotaenia*, Hongkong to W. Hupeh, China.

Tribe II.—Podocarpeae.

6. **Phaerosphaera** *Archer.*—2 spp., *P. Hookeriana* (type), Tasmania ; *P. Fitzgeraldii*, New S. Wales.
7. **Dacrydium** *Soland.*—14 spp., Malaya, New Guinea, New Caledonia, New Zealand ; type sp. *D. cupressinum*, New Zealand.
8. **Acmopyle** *Pilger*, Monogr. Taxac. 117, fig. 24 (1903).—1 sp., *A. Pancheri*, New Caledonia.
9. **Podocarpus** *L' Hérit.*—about 65 spp., Tropics and Subtropics, mostly Southern Hemisphere : type sp. *P. elongata*, S. Africa.
10. **Saxegothaea** *Lindl.*—1 sp., *S. conspicua*, Chile.
11. **Microcachrys** *Hk. f.*—1 sp., *M. tetragona*, Tasmania.
12. **Phyllocladus** *L. C. Rich.*—6 spp., Philippines to New Zealand ; type sp. *P. rhomboidalis*, Tasmania.

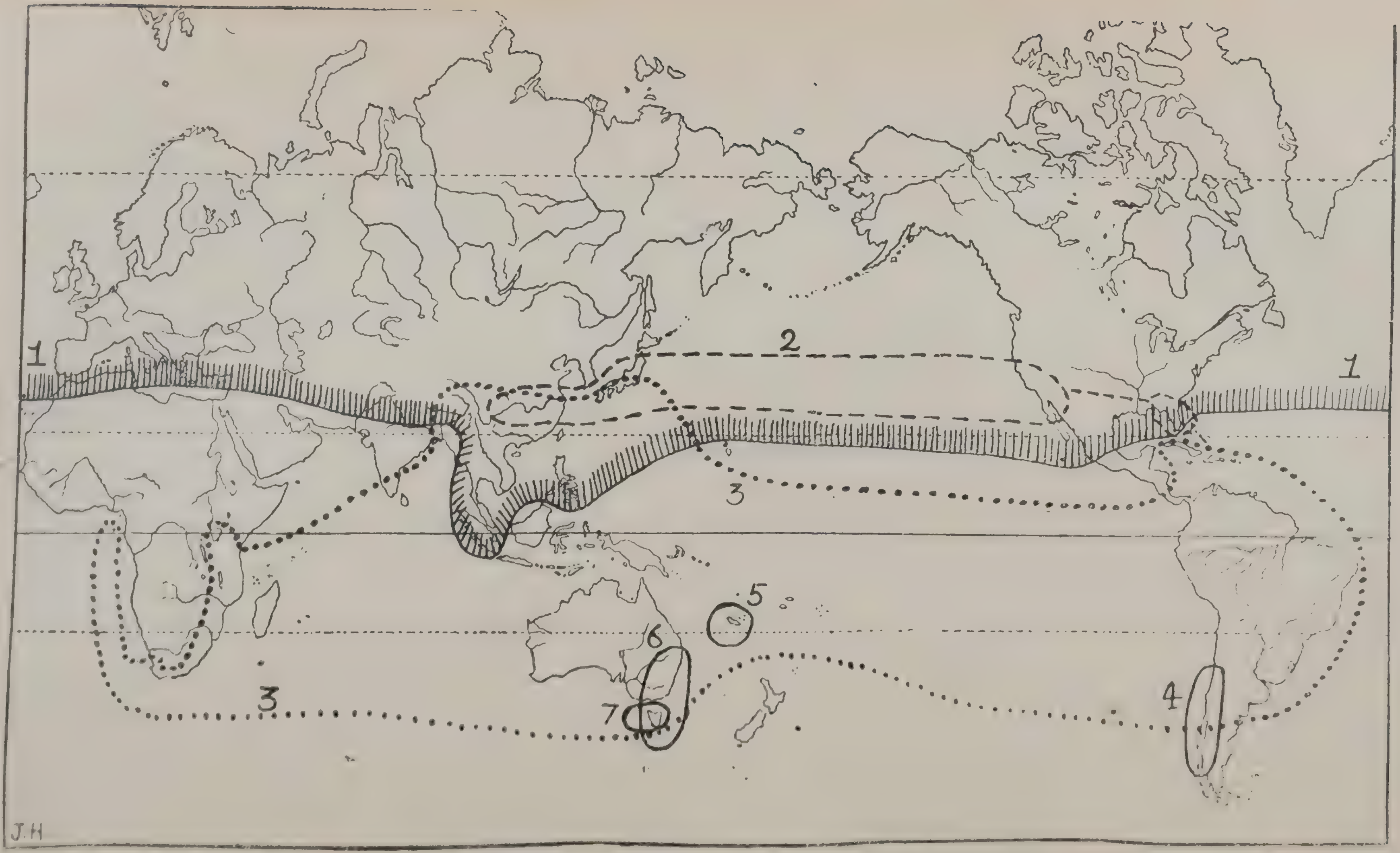
The *Taxaceae* have usually been included as a tribe in the more comprehensive family "Coniferae", and they are so placed by Bentham & Hooker and by Engler & Prantl. They were regarded as a distinct family by Lindley, however, and are now generally accepted as such, although the dividing line between them and the *Pinaceae* is not very definite. The genus *Saxegothaea* approaches most closely the *Pinaceae*, and appears to be a connecting link between the two families. *Taxaceae* have been monographed by Pilger in Engler's *Das Pflanzenreich* iv. v. (1903). The same author's " Kritische Übersicht über die neuere Literatur betreffend die Familie der Taxaceae " in Engler's Bot. Jahrb. 54 : 1–43 (1916) should also be consulted. A useful bibliography will be found in Coulter & Chamberlain, Morphology of Gymnosperms, pp. 313–362, with 181 references.

GEOGRAPHICAL DISTRIBUTION.

The two tribes of *Taxaceae* here recognised show a striking contrast in their distribution, the Taxads proper (*Taxeae*) being almost confined to the Northern Hemisphere, the Podocarps (*Podocarpeae*) almost exclusively to the Southern Hemisphere. Of the former the genus *Taxus* (see map) ranges, with about 7 spp. or geographical races, right across the North Temperate region, reaching its southern limits in Algeria (*T. baccata*), in Sumatra (*T. Wallichiana*), and in Central Mexico (*T. globosa*). *Cephalotaxus*, 5 spp., occurs at considerable elevations from the mountains of Assam through Central China to Japan, and *Amentotaxus* from Hongkong to Hupeh, China, whilst *Torreya*, 5 spp., ranges from Western China to Japan and occurs in California and Florida. The most widely distributed species of this tribe is the common yew, *Taxus baccata*, which ranges from the Azores and Western Europe to Northern Persia, whilst *T. Wallichiana* extends from the Kashmir Himalaya to Sumatra and the Philippines.

Of more than usual interest from a phylogenetic and phytogeographical standpoint is the recently described *Austrotaxus*, a new genus found by Compton in New Caledonia, which in structure is closely allied to *Taxus* and *Torreya*, with the habit of *Podocarpus*. The map of distribution shows that *Taxus* and *Podocarpus* intermingle only in the Indo-Malaya, whilst *Torreya* stretches east and west across the Northern Pacific from South China to Florida. The discovery of this interesting genus in New Caledonia adds one more to the already long list of ancient types of vegetation found in that island.

Of the Podocarps, the genus *Podocarpus* is most widely distributed, occupying in the Southern Hemisphere a similar position to *Pinus* in the Northern ; it is represented from the Eastern Himalaya and the Nilgiris to Japan ; thence to Fiji, New Caledonia and N.E. Australia, Madagascar, East African Mountains, S. Africa, St. Thomas Island (W. Africa), and in America from Costa Rica to Brazil and Chile. *Dacrydium* and *Phyllocladus* have rather a wide range from the Malay Peninsula and Archipelago to Tasmania and New Zealand, but are absent from Australia. *Phaerosphaera* occurs in S.E. Australia and Tasmania, *Microcachrys* in Tasmania, *Acmopyle* in New Caledonia, whilst Chile claims *Saxegothaea*.



Distribution of certain genera of TAXACEAE.
1. Southern limits of TAXUS and tribe *Taxeae* (except AUSTROTAXUS in New Caledonia). 2. TORREYA. 3. PODOCARPUS. 4. SAXEGOTHAEA. 5. ACMOPYLE. 6. PHAEROSPHAERA. 7. MICROCACHRYS.

PINACEAE.

KEY TO THE TRIBES.

Subfamily I. **Abietoideae.** Leaves and cone-scales spirally arranged; ovuliferous scale free from or adnate to the subtending bract.

Cone-scales spirally imbricate; ovuliferous scale free from the subtending bract or only slightly adnate at the base; ovules 2 to each scale, inverted, with the micropyle adaxial; seeds usually samaroid - - - - - Tribe I. ABIETEAE.

Cone-scales spirally closely imbricate; ovuliferous scale very thin and completely adnate to the subtending bract, not visible externally; ovules 1–6 to each scale, inverted, inserted collaterally about or below the middle of each scale; seeds laterally winged or not winged, never samaroid - - Tribe II. ARAUCARIEAE.

Cone-scales spirally arranged but not closely imbricate; ovuliferous scale completely adnate to the subtending bract and much thickened and conspicuous externally, sometimes nearly obscuring the bract; male cones spicate, umbellate or paniculate; ovules 2–6, erect or inverted; seeds more or less narrowly and laterally winged - - Tribe III. TAXODIEAE.

Subfamily II. **Cupressoideae.** Leaves and cone-scales opposite and decussate or in whorls of 3, 4, 6 or 8; ovuliferous scale completely adnate to the bract, often totally obscuring it.

Fertile cone-scales in more than one series, crowded - - - Tribe IV. CUPRESSEAE.

Fertile cone-scales in a single whorl of 4, 6 or 8, rarely slightly 2-seriate, woody, more or less valvate - - Tribe V. CALLITREAE.

KEY TO THE GENERA.

Subfamily I.—**Abietoideae.**

Tribe I.—ABIETEAE.

§Leaves all more or less of one kind:

*Branches all of one kind, of unlimited growth; leaves not in fascicles - - - - - - Subtribe PICINEAE.

Branches rough and muricate with the persistent decurrent stalks of the fallen leaves; scales persistent on the cone axis:

Branchlets very rough with the closely set rather long leaf bases; persistent bud scales at the base of each season's growth usually very conspicuous; anther-connective produced into a scale-like appendage - - 1. **Picea.**

Branchlets slightly rough with the lax short leaf-bases; persistent bud scales not conspicuous; anther-connective merely umbonate beyond the cells - - - - - 2. **Tsuga.**

Branchlets comparatively smooth, marked only with the scars of the fallen sessile leaves:

Male cones umbellate; leaves keeled on both surfaces - - 3. **Keteleeria.**

Male cones solitary or racemose:

Cone-scales deciduous - - 4. **Abies.**

Cone-scales persistent; leaf buds beech-like - - - 5. **Pseudotsuga.**

**Branches of two kinds, some elongated and sparsely leafy, others abbreviated and bearing fascicles of leaves - - - - - Subtribe LARICINEAE.

Leaves evergreen; cone-scales at length deciduous - - - 6. **Cedrus.**

Leaves deciduous:

Male cones solitary, catkin-like; female cone-scales persistent; pollen grains not winged - - - - - 7. **Larix.**

Male cones umbellate; female cone-scales deciduous; pollen grains winged; buds conspicuously awned - - - - 8. **Pseudolarix.**

§§Leaves and branchlets of two kinds, small membranous scale leaves on the long shoots, needle-like leaves on the short shoots - - - - Subtribe PININEAE.

Leaves needle-like, in fascicles of 2–6 - - - - - - - 9. **Pinus.**

Tribe II.—ARAUCARIEAE.

Monoecious; seeds not adnate to the ovuliferous scale:

Leaves large, broad, with numerous parallel nerves; ovule usually 1; Malaya to Polynesia and New Zealand 10. **Agathis.**

Leaves linear, acute, spreading in one plane; ovules 2–4; China, Japan 11. **Cunninghamia.**

Leaves small, triangular, closely imbricate; ovules 2; Formosa - - 12. **Taiwania.**

Dioecious; seed adnate to the ovuliferous scale - - - - - 13. **Araucaria.**

Tribe III.—TAXODIEAE.

Leaves normal; no phylloclades present:

Male cones spicate:

Leaves hard and always persistent:

Seeds pendulous; cone-scales not lobed:

Cones globose; anther-cells 2 - - - - - 14. **Athrotaxis.**

Cones oblong-ellipsoid; anther-cells 4–5 - - - 15. **Sequoia.**

Seeds erect; cone-scales laciniate-lobate - - - 16. **Cryptomeria.**

Leaves soft and usually deciduous; cones oblong-ellipsoid - - - 17. **Glyptostrobus.**

Male cones paniculate; leaves soft, usually deciduous; cones globose, hard, ball-like - - - 18. **Taxodium.**

Leaves small, scattered, scale-like, with decurrent, large, linear-acicular, subverticillate phylloclades; monotypic Japanese genus - - - - 19. **Sciadopitys.**

Subfamily II.—**Cupressoideae.**

Tribe IV.—CUPRESSEAE.

Cone-scales woody, joined only at the base - - - - - - - Subtribe THUINEAE.

Flowers dioecious; cone-scales thin; Southern Hemisphere:

Seeds 2-winged; S. America - 20. **Fitzroya.**

Seeds 3-winged; Tasmania - 21. **Diselma.**

Flowers monoecious, very rarely

dioecious; cone-scales thick; mainly Northern Hemisphere:

Cone-scales radiating, truncate and peltate, forming a globose or ovoid head:

Leaves subequal, closely imbricate; seeds usually more than 2 - - - - 22. **Cupressus.**

Leaves in one rank much larger than in the other, the smaller ones almost scale-like; seeds 2 to each scale, 2-winged - - - - 23. **Fokienia.**

Cone-scales mostly ascending, more or less oblong or clavate, obtuse or rounded at the apex, often with a dorsal horn-like bract:

Cone-scales more than 6; seeds equally winged or not winged - - - - 24. **Thuya.**

Cone-scales 6, only the middle ones fertile; seeds obliquely winged at the apex - - 25. **Libocedrus.**

Cone-scales at length fleshy and berry-like, concrescent - - - Subtribe JUNIPERINEAE.

One genus in the Northern Hemisphere - - - - - - 26. **Juniperus.**

Tribe V.—CALLITREAE.

Branchlets angular; cones paniculate, their axes produced above the base of the scales:

Fertile cone-scales 6–8, usually unequal, pointed or acute; Australasia - - - - 27. **Callitris.**

Fertile cone-scales 6, equal; West Australia - - - 28. **Actinostrobus.**

Fertile cone-scales 4, equal, truncate; E. and S.E. Africa - 29. **Widdringtonia.**

Branchlets compressed; cone axis not produced beyond the base of the 4 bracts: N. Africa- - - 30. **Tetraclinis.**

Tribe I.—ABIETEAE.

1. **Picea** *Link.*—40 spp., North Temperate Zone.
2. **Tsuga** *Carr.*—10 spp., Asia, N. America; type sp. *T. Sieboldii*, Japan.
3. **Keteleeria** *Carr.*—5 spp., China, Japan, Formosa; type sp. *K. Fortunei*, Japan.
4. **Abies** *Link.*—33 spp., North Temperate Zone.

5. **Pseudotsuga** *Carr.*—2 spp., N. America; type sp. *P. mucronata* (*P. Douglasii*), Rocky Mts. and Coast Ranges from 54° N. to Mexico.
6. **Cedrus** *Tourn.* ex *Loud.*—4 spp., Atlas Mtns. to Himalaya; type sp. *C. Libani*, Asia Minor.
7. **Larix** *Mill.*—15 spp., North Temperate Zone; type sp. *L. europaea*, Switzerland.
8. **Pseudolarix** *Gord.*—1 sp., *P. Kaempferi*, E. China.
9. **Pinus** *Linn.*—70 spp., Temp. Northern Hemisphere, West Indies, Central America; type sp. *P. sylvestris*, Europe.

Tribe II.—Araucarieae.

10. **Agathis** *Salisb.*—15 spp., Malaya to New Zealand, Polynesia; type sp. *A. loranthifolia*, Mal. Penins. to Philippines.
11. **Cunninghamia** *R. Br.*—1 sp., *C. sinensis*, W. China to Japan.
12. **Taiwania** *Hayata* in Journ. Linn. Soc. 37: 330, t. 16 (1906).—1 sp., *T. cryptomerioides*, Formosa.
13. **Araucaria** *Juss.*—15 spp., New Guinea, East Australasia, S. America; type sp. *A. imbricata*, Chile.

Tribe III.—Taxodieae.

14. **Athrotaxis** *D. Don.*—3 spp., Tasmania; type sp. *T. laxifolia*.
15. **Sequoia** *Endl.*—2 spp., Pacific N. America; type sp. *S. sempervirens*, S. Oregon to California.
16. **Cryptomeria** *D. Don.*—1 sp., *C. japonica*, West and South China to Japan.
17. **Glyptostrobus** *Endl.*—1 sp., *G. heterophylla*, S. China.
18. **Taxodium** *L. C. Rich.*—1 sp., *T. distichum*, S.E. United States.
19. **Sciadopitys** *Sieb. & Zucc.*—1 sp., *S. verticillata*, Japan.

Tribe IV.—Cupresseae.

20. **Fitzroya** *Hook. f.*—1 sp., *F. patagonica*, Chile and Patagonia.
21. **Diselma** *Hook. f.*—1 sp., *D. Archeri*, Tasmania.
22. **Cupressus** *Linn.*—14 spp., North Temperate Zone; type sp. *C. sempervirens*, Mediterranean to Western India.
23. **Fokienia** *A. Henry & Thomas* in Gard. Chron. 49: 67, ff.—1 sp., *F. Hodginsii*, China.
24. **Thuya** *Linn.*—about 12 spp., North Temperate Zone; type sp. *T. occidentalis*, N.E. Asia, N. America.
25. **Libocedrus** *Endl.*—9 spp., S.W. China to New Zealand; W. Temperate South Amer.; type sp. *L. Doniana*, New Zealand.
26. **Juniperus** *Linn.*—28 spp., Northern Hemisphere, Mts. of E. Africa; type sp. *J. communis*, widely spread in the North Temperate Zone.

Tribe V.—Callitreae.

27. **Callitris** *Vent.* (*Callitropsis* Compton)—18 spp., Australasia; type sp. *C. rhomboidea*, Australia.

28. **Actinostrobus** *Miquel*—2 spp., Western Australia; type sp. *A. pyramidalis*.

29. **Widdringtonia** *Endl.*—5 spp., Africa; type sp. *W. juniperoides*, S. Africa.

30. **Tetraclinis** *Masters* in Journ. Linn. Soc. 30: 14 (1893).—1 sp., *T. articulata*, N. Africa, Malta, Carthagena.—See Sommier in Bull. Soc. Bot. Ital. 1906: 115, for records in Malta and Carthagena.

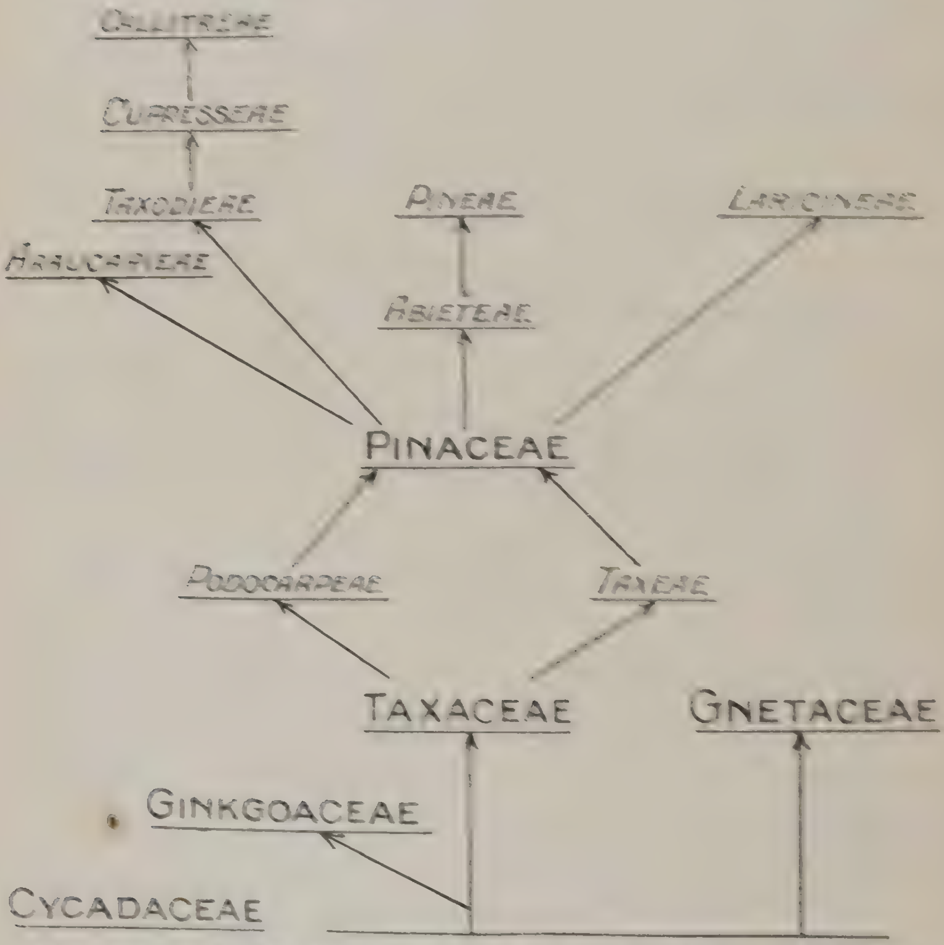
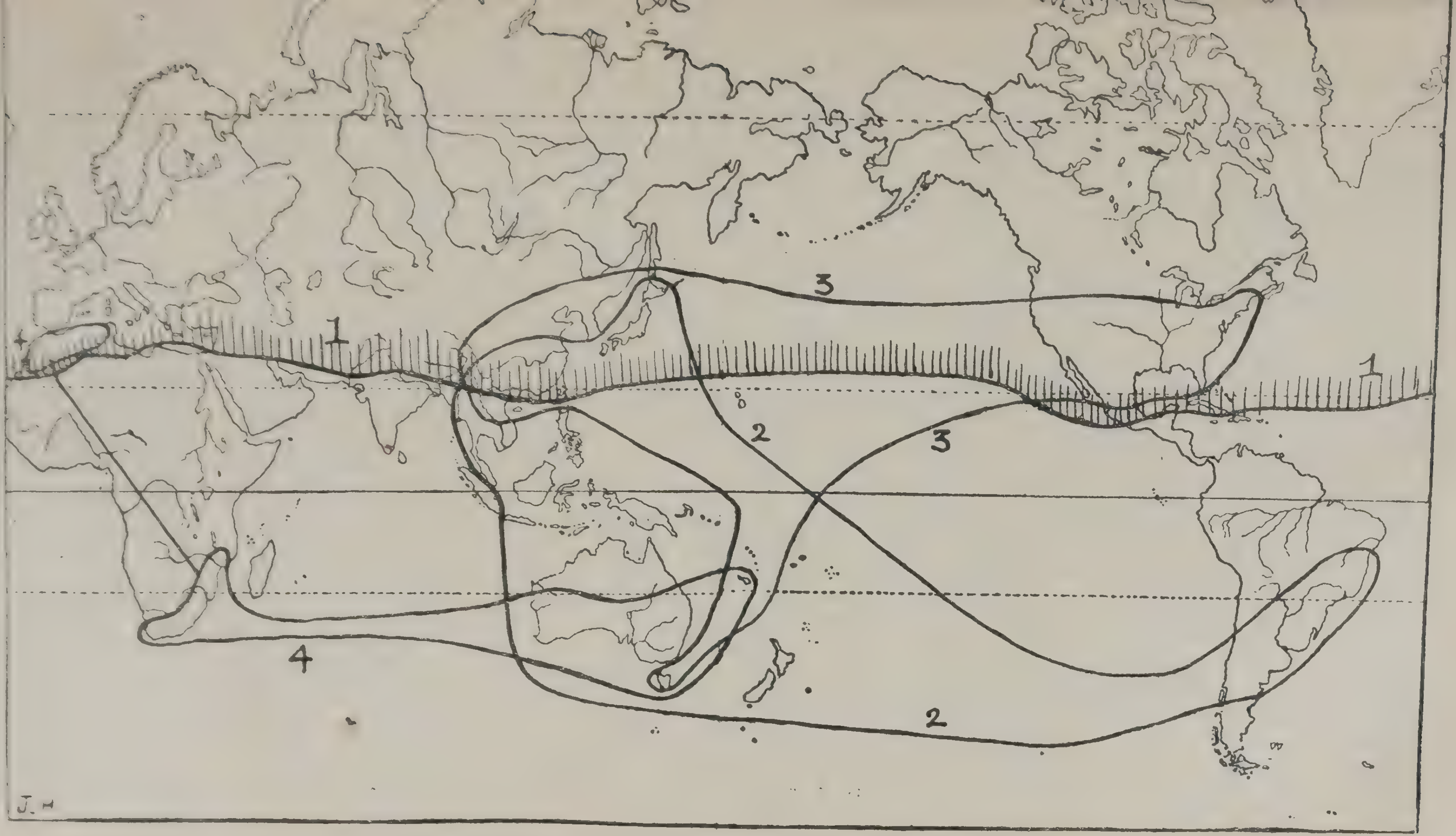


Diagram showing the approximate relationships of the principal groups of living Gymnosperms. The *Callitreae*, *Pineae* and *Laricineae* are regarded as the most recently evolved of the *Pinaceae*.

For a considerable period the family *Pinaceae* engaged the attention of the late Dr. Masters, and his sound views on the genera are reflected in the key given above. The literature relating to the family is so vast that no useful purpose would be served in enumerating it here. Extensive bibliographies will be found in Eichler in Engler and Prantl, Naturl. Pflanzenf. 2, i: 28 (1889); Penhallow, Manual of North American Gymno-



Distribution of tribes of PINACEAE (except CUPRESSEAE).

1. Southern limits of ABIETEAE. 2. ARAUCARIEAE.
3. TAXODIEAE. 4. CALLITREAE.

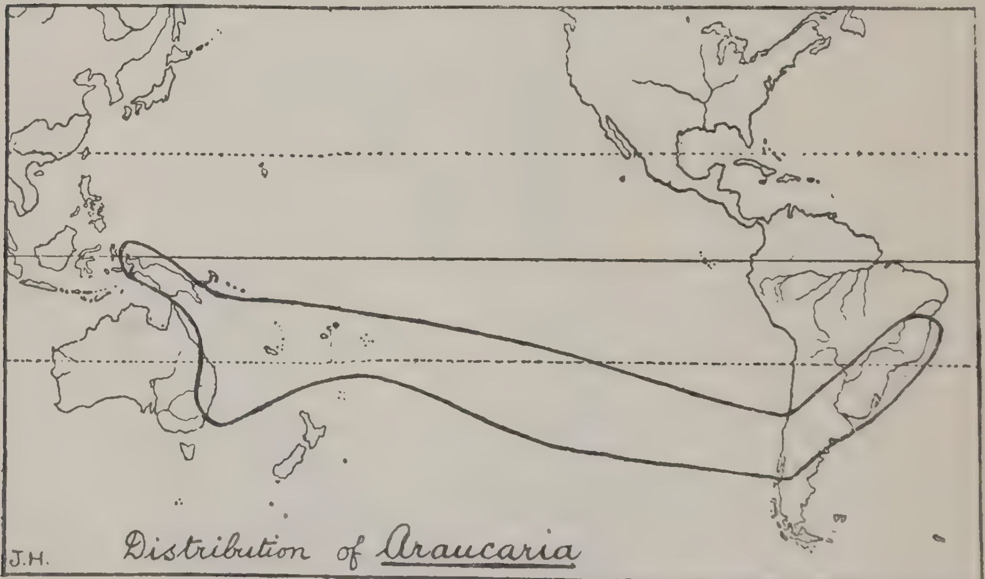
sperms (1907), p. 363; Scott, Studies in Fossil Botany (1909); Coulter and Chamberlain, Morphology of Gymnosperms (1910) pp. 220–312, and Seward, Fossil Plants, vol. 4.

GEOGRAPHICAL DISTRIBUTION.

The map (see p. 63) shows to a striking degree the great intercontinental connections between the Conifer floras of South America and Australasia (*Araucarieae*), Australia and South Africa (*Callitreae*), and S.E. China and the United States of America (*Taxodieae*).

Tribe *Abieteae* is entirely confined to the Northern Hemisphere (see map), ranging from sea-level to the limits of phanerogamic vegetation on high mountains and towards the Pole. Very few specimens of this tribe enter the tropics, and then only at high elevations. In the Old World the tribe reaches its southern limits in the Canaries (the endemic *Pinus canariensis*), the Atlas Mts. of Morocco and Algeria (*Cedrus atlantica*), the Southern Slopes of the Himalaya, and in the New World on the high plateaux of Central America.

The principal genera, *Picea*, *Tsuga*, *Abies*, *Larix* and *Pinus*, have a very wide distribution in the northern parts of the Old and New Worlds. The remainder are comparatively small and restricted in their range, *Cedrus* showing an interesting link between the coniferous flora of the Atlas Mts., Cyprus, Asia Minor and the North West Himalaya. Indeed, Hooker considered the four species now generally recognised as occurring in these regions respectively to be little more than geographical races of one, so closely are they related. *Keteleeria* and *Pseudolarix* are confined to China, the former also in Formosa, whilst *Pseudotsuga* has a long latitudinal range in the mountains of Pacific N. America.



Distribution of Araucaria

Tribe *Araucarieae* is absent from the Old World west of the Malay Peninsula and Yunnan, and in the New World is found only in S. America. *Agathis*, the largest genus, ranges from the

Malay Peninsula and the Philippines through Eastern Australia to Fiji and New Zealand; *A. loranthifolia*, the most widely spread species, from the Malay Peninsula to Java, Borneo and the Philippines. The monotypic *Cunninghamia* occurs from Western China to Japan, and *Taiwania* is a curious Formosan genus. *Araucaria* shows an ancient connection between the coniferous floras of Australia and South America.

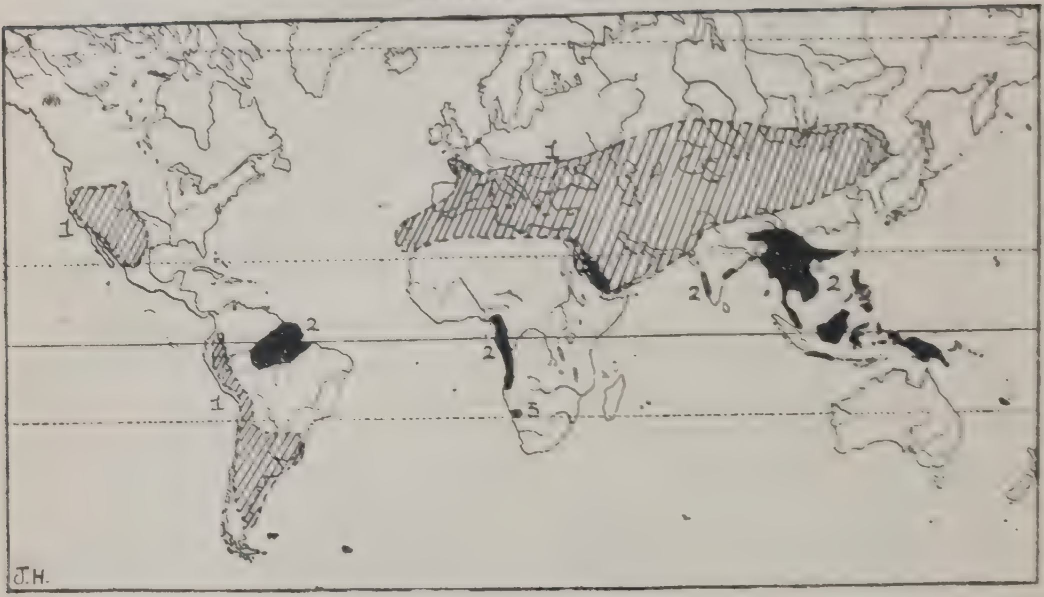
Tribe *Taxodieae* is rather scattered and is found in both hemispheres. *Athrotaxis* is the only genus in the Southern Hemisphere and is confined to Tasmania. *Sequoia* is confined to Pacific, and *Taxodium* to Atlantic North America, whilst *Cryptomeria* is common to China and Japan, and *Glyptostrobus* endemic to South China.

Tribe *Cupresseae* has also a very scattered distribution, *Cupressus*, *Juniperus*, and *Thuya* occurring throughout the North Temperate Zone, *Juniperus* entering the Northern Tropic only in the East African mountains. *Libocedrus* has a wide range through Yunnan and Formosa, New Guinea, New Caledonia, New Zealand, California, and West Temperate South America, the remaining genera being restricted, *Fitzroya* to Temperate South America, *Diselma* to Tasmania, and *Fokienia* to S. China.

Except for the monotypic *Tetraclinis* in the Moroccan and Algerian Atlas, tribe *Callitreae* is found only in the Southern Hemisphere, *Callitris* occurring in Australia and New Caledonia, *Actinostrobus* in Western Australia, and *Widdringtonia* in S.E. Tropical and South Africa.

Most of the species of *Pinaceae* are restricted in their distribution. Examples of wide range, however, are: *Juniperus communis*, throughout the N. Temp. Zone including Greenland; *Juniperus virginiana* and *Picea canadensis*, widely spread in North America; *Abies pectinata*, Spain to S.W. Russia; *Pseudotsuga mucronata*, an extended north to south range in West North America; *Larix americana*, Labrador to Alaska; *Cupressus sempervirens*, West Europe to Western India. Examples of extremely limited range are afforded by *Cupressus macrocarpa*, the Monterey Cypress, which inhabits a small stretch of the Californian coast south of the Bay of Monterey, not more than two miles long and two hundred yards wide. Sargent (Silva, 10, 104) expresses the opinion that, on account of the vigorous constitution which this tree shows in its ability to withstand long exposure to gales and saline spray on the cliffs of the Pacific Ocean, and its unusual power of adapting itself to very different climatic conditions under cultivation, it once occupied a much larger area of Central California, and has been restricted to the shore of Carmel Bay by the gradual drying of the climate or by fire during comparatively recent times. Another local species is *Cupressus Macnabiana*, which occupies only a few dry hill slopes near Clear Lake, California. A striking example of a pine confined to a small group of oceanic islands is *Pinus canariensis*, the dominant forest tree in the Canaries. Its nearest relatives are found in Central America.

GNETACEAE.



Distribution of GNETACEAE.

1. EPHEDRA. 2. GNETUM. 3. WELWITSCHIA. The genera are entirely isolated from one another. The area of *Welwitschia* is much enlarged to indicate its position.

V.—NOTES ON TASMANIAN HEPATICS.

W. H. PEARSON.

Mr. W. A. Weymouth, of Hobart, Tasmania, who attained his eightieth birthday on the 24th of September last,* sent me some time ago a rich collection of Tasmanian Hepatics to name, with the intention of distributing sets from his extensive gatherings, for charitable purposes. The specimens are large and in very good condition, and reflect great credit on this veteran hepaticologist.

In the collection there are three species which so far as I know are new, descriptions of which follow. In addition to these, there are two varieties of the variable *Lophocolea heterophylloides* Nees, which species seems to be very abundant, and widely distributed in that country, to judge by the numerous specimens received.

The genus *Lophocolea* is remarkably well represented in Tasmania; Mr. L. Rodway enumerates no less than 42 species, whilst the number recorded by Stephani for all Europe, Asia and North America is only 14. To obey the laws of nomenclature, I should give a short diagnosis in Latin for the new species, but I follow Prof. Evans, who defies these laws, describing at length all the minute characters of his new species in English; and it is a pleasure to be able to identify his species from his lucid descriptions. The *Hepaticae*, although so small, have so many organs to describe; their stems, rhizoids, leaves, underleaves, bracts, perianths, capsules, spores, elaters and male flowers, that without a clear description of each particular organ, it is difficult, if not impossible, to recognise the same.

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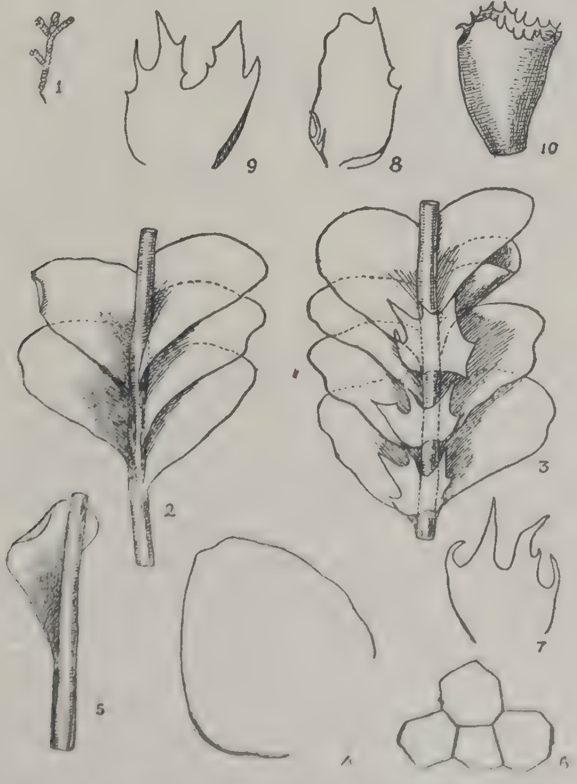
* 24th September, 1921.—This paper with the collection was offered to Kew by Mr. Pearson shortly before his death on the 19th April, 1923, but it has only recently been received for publication.

The following is a list of species sent :—

Hymenophytum phyllanthus (*Hook.*) *Dum.*
Symphogyna obovata (*Tayl.*) *Gott., Lindenb. & Nees.*
Symphyomitra Drummondii (*Mitt.*) *Spruce.*
Cuspidatula monodon (*Tayl.*) *St.*
Plagiochila radiculosa *Mitt.*
P. biserialis *L. et L.*
P. deltoidea *Lindenb.*
P. fasciculata *Lindenb.*
P. retrospectans *Nees.*
P. recurvifolia *St.* A very beautiful species.

Lophocolea macrostipula *St.* A very distinct species, the concave rotund underleaves, with a lunate sinus, and a small tooth at the base of the two segments distinguish it from any of the forms of *L. heterophylloides* Nees, of which some have much larger underleaves.

L. heterophylloides *Nees* (Numerous forms). Stephani says fruit rare and does not give a description of it. One of Mr. Weymouth's specimens was covered with capsules. Pedicel



L. heterophylloides var. decurrens.

Fig. 1. Plant ½ nat. size. 2. Portion of stem, antical view (× 8). 3. Ditto postical view (× 8). 4, 5. Leaves (× 12). 6. Portion of leaf (× 145). 7. Underleaf (× 12). 8. Bract (× 8). 9. Bracteole (× 8). 10. Perianth (× 8).

8 to 10 mm. long; capsule ·75 mm., dark brown; valves, through transmitted light, reddish brown; spores ·01 mm., smooth, light brown; elaters bispiral, about 12 turns, ·125 mm. long × ·01 mm. broad.

Lophocolea heterophylloides *Nees* var. **decurrens** *Pears.* Distinguished from type by its large, very decurrent leaves, some stems appearing to be winged, and its large underleaves.

Dimensions. Stems 2·53 cm. long, ·3 mm. diam., with leaves 3 mm. wide; leaves 3 mm. long × 2·5 mm. broad, 2·5 mm. × 2·5 mm., 2·5 mm. × 2 mm., 2 mm. × 1·75 mm.; cells ·04 mm.; underleaves 1·5 mm. high × 1 mm. broad, 1·5 mm. × 1·5 mm., 1·25 mm. × 1 mm.; bracts 2 mm. long × 1 mm. broad, 2 mm. × 1·25 mm.; bracteole 2 mm. high × 1·5 mm. broad; perianth 2 mm. long × 1·25 mm. broad. (See Fig. 1, p. 67).

Lophocolea heterophylloides *Nees* var. **macrocalyx** *Pears.* Hardly to be separated from var. *decurrens*; remarkable for its very large involucres.

L. Forsythiana *St.*

L. macroloba *St.*

L. Weymouthii *St.*

L. submarginata *Tayl.*

L. leucophylla *Tayl.*

Chiloscyphus fissistipus *Tayl.*

C. Moorei *St.*

C. laxus *Mitt.*

Adelanthus falcatus (*Hook.*) *Mitt.*

Lepicolea scolopendra (*Hook.*) *Dum.*

Lepidolaena magellanica (*Lam.*) *Schiffn.*

Radula buccinifera *Tayl.*

Frullania deplanata *Mitt.*

F. diplota *Tayl.*

F. falciloba *Tayl.*

Frullania (**Trachycolea**) **reptans** *Mitten.* Dioicous. Small; pale to reddish brown in colour; in thin flat patches on rocks and trees. Stem composed of minute cells, frontally compressed. 6 × 8 cells, inner same as cortical; prostrate; irregularly pinnate or bipinnate; rhizoids few, dull white. Leaves: lobe horizontal (90°) or slightly ascending (80°), subopposite, convex. antical (upper) margin extending beyond the stem, oblong-orbicular, broader than high, entire, antical margin slightly ampliate, apex rotundate; lobule galeate, lower part on a level with the lobe, mouth distinct; stylus small, triangular or lanceolate, often wanting; cells small, irregularly quadrate. walls thick, with nodules at the corners, no trigones. Underleaves approximate or distant, rather wider than the stem. obcuneate, angular to rotund, bifid to about ⅓rd, with or without a notch on exterior of segments at the middle. Bracts larger than the leaves; lobe oval; apex rotundate; lobule about

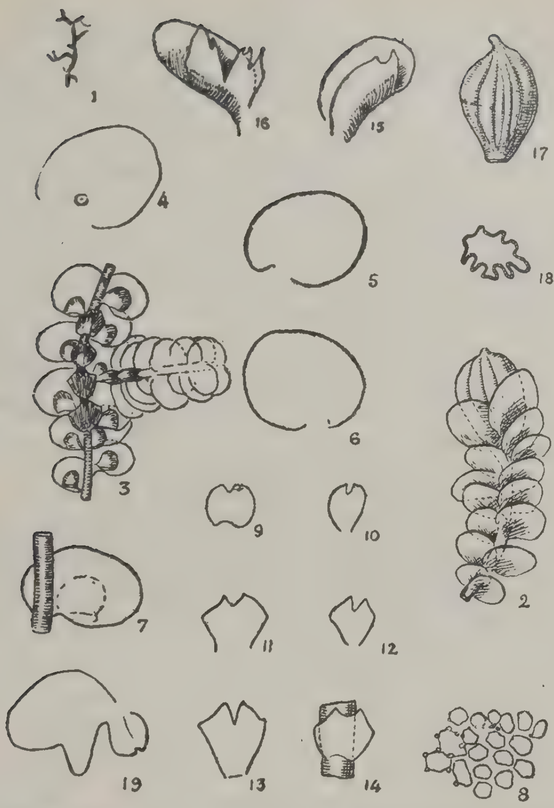


Fig. 1. Plant $\frac{1}{2}$ nat. size. 2. Portion of stem, with perianth, antical view (× 12). 3. Ditto, with amentula, postical view (× 12). 4-7. Leaves (× 25). 8. Portion of leaf (× 145). 9–14. Underleaves (× 25). 15. Bract (× 12). 16. Bract and bracteole (× 12). 17. Perianth (× 12). 18. Cross-section of perianth (× 12). 19. Male bract and bracteole, explanate (× 25).

$\frac{2}{3}$rds smaller, elliptic, acuminate, with one smaller acuminate segment. Bracteole connate with the bract, oblong-quadrate, bifid, trifid or quadrifid. Perianth projecting about $\frac{1}{2}$ beyond the bracts, oval, 9-plicate, with 2 antical, 2 lateral and 5 postical keels, deep, obtuse, smooth or uneven, beak long. Androecia on short lateral branches, catkin-like with 6–8 pairs of bracts, rarely capitate with four pairs of bracts; perigonial bracts semi-rotund, apex rotundate, lobule short, narrowly ovate, obtuse.

Dimensions. Stems 2·5 cm. long; ·1 mm. diam., with leaves 1 mm. wide; leaves, lobe ·55 mm. × ·45mm., lobule ·1 mm × ·1 mm.; cells ·02 mm.; underleaves ·2 mm. × ·2 mm.; bract, lobe 1 mm. × ·6 mm., lobule ·9 mm. × ·4 mm.; bracteole ·75 mm. × ·3 mm.; perianth 1 mm. × ·75 mm.

These specimens were determined by Stephani as *Frullania pentapleura* Tayl. *F. pentapleura* Tayl., however, has perianths with five (never more) keels, which, though always present, are sometimes not well developed; the bract-lobule is entire and the inflorescence dioicous (not monoicous as stated by Stephani). As Weymouth's specimens did not agree with these characters and I could not reconcile the plants with the descriptions of *F. reptans* Mitt. nor of any other published species of *Frullania*, I concluded they belong to an undescribed species. Through the kindness of the authorities at Kew, however, I have had the opportunity of examining the original specimens of *F. reptans* Mitt., with which they entirely agree. I add a fuller, and I believe a more correct, description of the species than the ones given by Mitten and Stephani.

Mitten's description is very short and vague. He says underleaves 4-toothed. Whilst varying considerably on the same stem, they cannot be described as 4-toothed, although Bastow (Proc. Roy. Soc. Tasm. 1887, t. 29) figures them as quadrifid. Mitten describes the keels of the perianths as toothed, but they are smooth. Stephani says stems 10 cm. long, an evident slip for 10 mm.; interior margin of bract-lobule denticulate (I have seen no such character); androecia small, capitate, 2 pairs of bracts (they are usually long, 5 and 6 pairs of bracts, although occasionally shorter).

Rodway (Proc. Roy. Soc. Tasm. 1916, 137) states that *F. reptans* is rather more robust than *F. pentapleura* Tayl. *F. falsa* St., also from Tasmania, he reduces to a synonym of *F. pentapleura* Tayl., with a remark that it is a depauperated form growing on dry rocks. Stephani describes it (Syn. Hepat. iv. 413) with perianth obovato-oblong, 12-plicate, bracts falcato-ligulate, lobule lanceolate (evidently a very different species from *F. pentapleura* Tayl.).

Symphyomitra Weymouthii *Pearson* n. sp. Sterile. Small; pale green in colour, whitish below; loosely caespitose. Stem prostrate, simple or slightly branched, very tender, antical side plane, postical rounded, 8 × 6 and 6 × 4 cells, cortical cells

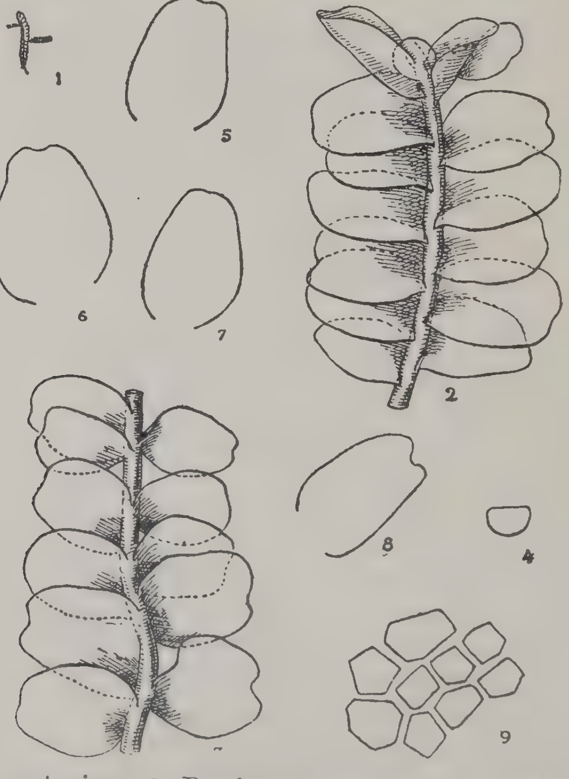


Fig. 1. Plant ½ nat. size. 2. Portion of stem, antical view (× 12). 3. Ditto, postical view (× 12). 4. Cross-section of stem (× 25). 5–8. Leaves (× 12). 9. Portion of leaf (× 145).

similar to the inner ; branches lateral, slightly postical, arising from below leaf, radiculose, rhizoids hyaline, straight, ascending to apex of stem, flagelliferous, flagellae postical, microphyllous, radiculose. Leaves horizontally inserted, imbricate, slightly concave or plane, broadly ovate, oblong-ovate or roundish-oblong-quadrate, entire or retuse, upper (postical) margin extending to middle of stem, lower leaves smaller, bifid ; cells medium size, 4-, 5- and 6- sided ; walls thin, no trigones.

Dimensions. Stems 1·3 to 2·5 cm. long ; diam. ·2 mm., with leaves 2·25 mm. wide ; leaves 1·5 mm. × 1 mm., 1·25 mm. × ·9 mm., 1·1 mm. × ·8 mm. ; cells ·04 mm. × ·03 mm., ·035 mm. × ·035 mm.

I know of no species with which this can be compared.

Lophocolea bicuspidata *Pearson* n. sp. Monoicous ; medium size, dark to dull green in colour, loosely caespitose. Stems irregularly and sparingly ramose. Leaves subopposite, horizontal (90°) to patent-divergent (70°), antical margin long-decurrent, straight or slightly curved (70°), postical (upper) margin curved, long-triangular, margin entire, apex 5 to 6 times narrower than the base, bicuspidate, segments acuminate, upper larger than lower, sinus rounded ; texture delicate, cuticle slightly papillose ; cells medium size, quadrate, walls thick, trigones minute. Underleaves large, connate with both leaves or one only, rarely free, broadly cuneate or subquadrate, rather

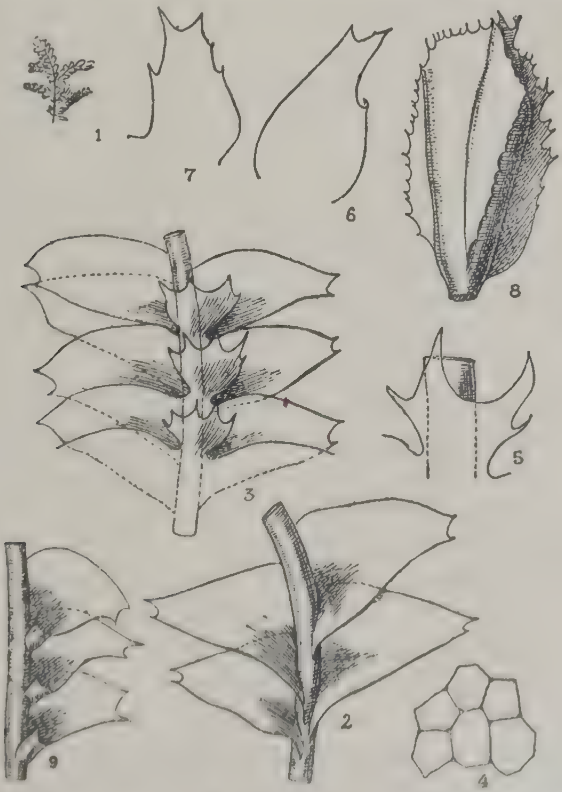


Fig. 1. Plant ½ nat. size. 2. Portion of stem, antical view (× 12). 3. Ditto, postical view (× 12). 4. Portion of leaf (× 145). 5. Underleaf (× 25) 6. Bract (× 12). 7. Bracteole (× 12). 8. Perianth (× 12). 9. Male bracts (× 12).

broader than high, bifid to about ⅓rd, sinus rounded ; segments with two or more teeth on their exterior sides, the upper larger than the lower, sometimes the uppermost segment is large, so that the underleaf might be described as quadrifid. Inflorescence terminal on chief stem or short branches. Bracts oblong-ovate, bifid to ¼th, margin entire or with a single small tooth near the middle. Bracteole connate with adjoining bract or bracts, oblong-quadrate, bifid to about ¼th, with two or 3 small teeth on the margin. Perianth projecting a little beyond the bracts, oblong, trialate, wings broad, spinulose-dentate, mouth spinulose-dentate. Male branches often delicate, bracts semirotund, apex bicuspidate, lobule very small, free margin acute.

Dimensions. Stem 2·5 cm. long, ·25 mm. diam., with leaves, 3 mm. wide ; leaves 1·75 mm. long × 1·25 mm. wide at base, ·2 mm. wide at apex ; cells ·03 mm. ; underleaves ·55 mm. high × ·65 mm. broad, ·65 mm. high × ·75 mm. broad ; bracts 1·75 mm. long × 1 mm. wide at base, ·3 mm. at apex, 2·25 mm. long × 1·25 mm. wide at base, ·4 mm. wide at apex ; bracteole 1·5 mm. long × ·75 mm. wide ; perianth 2·5 mm. long × 1·5 mm. wide.

Lophocolea decurva Mitten, according to Stephani's description, has ovate leaves and concave underleaves. *Lophocolea trialata* Gottsche has leaves broadly triangular, hardly longer than broad, large trigones, bracts minutely denticulate, bracteole sparsely denticulate, perianth 5 mm. long. Stephani reduces *Lophocolea tasmanica* Mitten to a synonym of this species. Rodway describes it with underleaves rotund, 4–8 spines, perianth 5 mm. long ; he does not include *L. decurva* Mitt. in his List of Tasmanian Hepatics, but refers it to *Saccogyna australis* Mitt.

Plagiochila hartziana *Pearson* n. sp. Dioicous. Medium size, dark brown in colour, caespitose. Stems simple or slightly branched, firm. Leaves alternate, imbricate or approximate, horizontal (90°) to erecto-patent (30°), semi-broadly ovate or rotund, entire or with from 1 to 4 acute teeth, antical (lower) margin very decurrent, usually straight, postical (upper) rounded, ampliate, extending to the middle of the stem, only slightly decurrent, apex rotundate or acute (unidentate) or with several teeth extending to the upper margin ; cuticle smooth, polished ; cells medium size, 4-, 5- and 6-sided, walls firm, angles thickened, no trigones.

Dimensions. Stems 2·5 to 5 cm. long, ·2 mm. diam., with leaves 2 mm. wide ; leaves 2 mm. × 1·25 mm., 1·5 mm. × 1 mm., 1 mm. × ·7 mm. ; cells ·03 mm.

Although I have access to the fine collection of Australian *Plagiochilae* in the Manchester Museum, which I have examined carefully, there are no species to which I can refer this. I forwarded it to Mr. Rodway for his opinion, he thought it might be *P. Lyallii* Mitten and sent me specimens of the same, determined by Stephani, and of which I have other specimens. It is entirely different in shape of leaves, teeth and cell structure. The drawings are from stems, with rather more dentate leaves than usual, the leaves are often entire or furnished with one acute tooth.

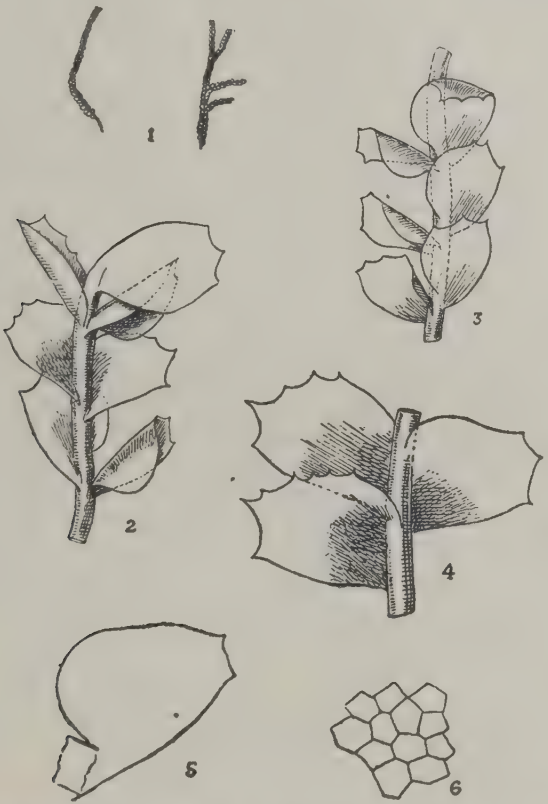


Fig. 1. Plants half nat. size. 2. Portion of stem, antical view (× 12). 3. Ditto, postical view (× 12). 4–5. Leaves (× 12). 6. Portion of leaf (× 145).

I have also been favoured with the loan of a number of Tasmanian Hepatics sent to Mr. W. E. Nicholson by Mr. Weymouth, which Mr. Nicholson and I have determined as follows :—

Aneura crassa (*Schwägr.*) *Nees*? Of which there is no satisfactory description. Nees (Syn. Hep. p. 500) places it with "Species dubiae" and Stephani (Sp. Hep. 274) with those unknown to him. A robust, coarse species, fronds about 2·5 cm. long, on cross-section slightly biconvex, 8 cells thick at the middle, cortical cells much smaller than inner, with dark walls, inner cells with hyaline walls, margin 2 cells thick.

Metzgeria concavula *Pearson* n. sp. Dioicous. Small, pale green in colour, densely stratose-caespitose, corticolous. Fronds repeatedly dichotomous, angle patent (50°) to erecto-patent (30°), margin much decurved, almost revolute; wings 12 cells wide, rarely 15 to 20, sparingly setose, margin setose, setae in pairs or more rarely single, straight or some slightly hamate, somewhat short and coarse, costa narrow, slender, 2 antical and 2 postical cortical cells, on cross-section rather broadly oval, 4 × 6 cells ; near the fork postical cortical cells 3, setose, densely so on some portions of the fronds ; cuticle slightly papillose ; cells 4-, 5- and 6-sided, moderate to rather large in size, walls thick, trigones minute. Calyptra long-clavate, pilose, hairs long, on upper portion more frequent. Capsule oval, valves pale reddish-brown ; spores golden-brown in colour, smooth.

elaters monospiral, reddish-brown in colour, long and very narrow. Androecia not seen. Gemmae abundant, marginal or rarely on the postical side of costa, usually oval-ligulate, but various in shape, disciform or stipitate, but all more or less remarkably concave.

Dimensions. Fronds 1·3 to 2·5 cm. long; 1·25 mm. wide, costa ·1 mm. wide; gemmae ·4 mm. × ·2 mm.; cells ·04 mm. × ·05 mm.; calyptra 1·25 mm. × ·4 mm. widest part; capsule ·5 mm. × ·35 mm.; spores ·03 mm.; elaters ·3 mm. long × ·01 mm.

Apart from the gemmiferous character of the plant, it differs from *M. nitida* Mitt., which has also a costa of 2 antical and 2 postical cortical cells, by its less transparent cells, thicker walls, smaller trigones, presence of setae on the wings, hardly papillose cuticle, shorter and stouter setae; in *M. nitida* they are very long and delicate; Stephani well names them cilia.

From *Metzgeria disciformis* Evans (Ann. of Bot. XXIV. 290) it differs in the more convex, narrower fronds with costa of 2 antical and 2 postical cortical cells, marginal setae in pairs, and in differently shaped gemmae, which are either marginal or postical.

Hab. Recherche—on Sassafrasin Forest, 200 ft. Tasmania, 19th January, 1911, *W. A. Weymouth* 1652. Recherche—on trees, Catamaran, near Ramsgate, Tasmania, 16th January, 1911, *W. A. Weymouth* 1654.

Metzgeria furcata (*L.*) *Lindb.* Monogr. Metzg. p. 35. Dioicous, non-gemmiparous, aeruginose, costa with 2 antical and 4 postical cortical cells, wings, costa and margin setose. Some of the fronds are remarkably broad and short. Stephani records the species from Tasmania (*Weymouth*).

Solenostoma rotata (*Tayl.*) *Mitt.* var. **exstipulata** *Pears.* I am somewhat uncertain about this determination; the plant is sterile and without underleaves. Bastow (Proc. Roy. Soc. Tasm. 1887, 234) in describing the species says underleaves "lanceolate or none".

Acrobolbus cinerascens (*L. et L.*) *Schiffn.*

Plagiochila radiculosa *Mitt.*

Lophocolea austroalpina *St.* Underleaves free.

L. heterophylloides *Nees.*

Chiloscyphus coalitus (*Hook.*) *Nees.* Stephani refers the specimens from Java distributed by Schiffner under this name to his *C. communis*. *C. coalitus* is a good type of the genus with the broad banded underleaves connate with the adjoining leaves; I have seen none such in the genus *Lophocolea*. The fig. 11, p. 592 in Goebel's "Organographie der Pflanzen" of *Lophocolea* from Malay is, in my opinion, a good figure of a *Chiloscyphus* and not a *Lophocolea*.

Lepidozia capilligera *Lindenb.* Syn. Hepat. 204. Dioicous. Medium size. Stems with 12 cortical cells, and opaque inner cells, graceful, delicate, bipinnate. pinna and pinnulae irregular in length, distant, alternate, slightly ascending, flagelliferous, some branches attenuate. Leaves distant, alternate, branch-leaves approximate, quadrifid, 8 cells wide at the base, 12 cells wide at the upper portion of disc, lobes 2 to 4 cells wide at the base; cells rather large to large. Perianth sessile, narrowly oblong, 5-plicate at the upper portion, mouth minutely setulose, setae few. Bracts small, broadly ovate-quadrate, emarginate, margin with a few minute teeth; bracteole broadly ovate, emarginate, margin entire. Androecia on chief stem or more often on attenuate branches, globose, with 2 pairs of bracts or catkin-like with 3 to 4 pairs of bracts, lobe ovate-acuminate, lobule similar but smaller.

Neither Lindenberg, Stephani nor any other authority seems to have seen either the male or fertile plant. Stephani describes the underleaves as being trifid; they are quadrifid as Lindenberg figures them, on the branches they are trifid and bifid. Mr. Rodway says that *L. Oldfieldiana* St., specimens of which I have not seen, is a small form of *L. capilligera*.

Stephani describes this species as with small leaves regularly and remotely pinnate, disc 4 cells long and minute underleaves; my specimens of *L. capilligera* have disc 6 to 8 cells long, with large underleaves.

Dimensions. Stems 2·5 to 3·7 cm. long, leaf-cells ·05 mm., basal ·08 mm. × ·04 mm.; perianth 4mm. × ·75 mm.; bracts ·9 mm. × ·65 mm.; bracteole ·7 mm. × ·5 mm.; perigonial bracts, lobe ·3 mm. × ·2 mm., lobule ·2 mm. × ·1 mm.; bracteole ·15 mm. × ·1 mm.; antheridia ·1 mm.

Radula aneurysmalis *Tayl.*

R. physoloba *Tayl.*

R. uvifera *Tayl.*

Drepanolejeunea latitans (*Tayl.*) *St.*

Mr. J. A. Wheldon has also sent me a few Tasmanian Hepatics collected at Russell's Falls, Russell's Falls River, Upper Derwent River, Macquarie Plains, in Aug.–Sept. 1909, but without the name of the collector.

Metzgeria nitida *Mitt.*

Hymenophytum phyllanthus (*Hook.*) *Dum.*

Tylimanthus saccatus (*Tayl.*) *Mitt.*

Chiloscyphus coalitus (*Hook.*) *Nees.*

Lepidozia asymmetrica *St.*

Isotachis subtrifida *Mitt.*

I. pusilla *St.*

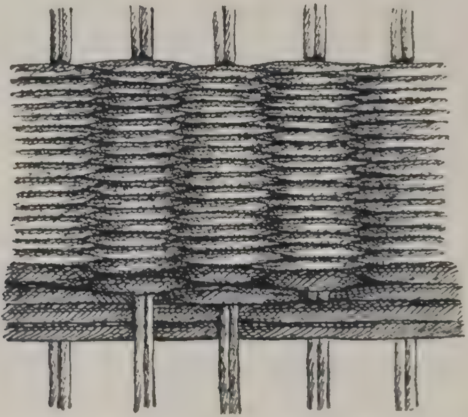
VI.—ANCIENT COTTON FABRICS IN THE SUDAN.

The accompanying sketch was made from a piece of fabric supplied by Mr. R. E. Massey, Government Botanist, Khartoum, who has also very kindly contributed the following article.

The discovery by Dr. Reisner during the last winter, in the tombs of the Greco-Roman period at Meroe, of textiles woven from cotton adds one more link to the chain of evidence that the cotton industry reached Egypt from the Sudan.

Meroe, the ruins of which are found some 60 miles south of the junction of the Atbara with the main Nile, was an important city and centre for trade with the Red Sea port of Ptolemais[1], Lower Egypt, and the lesser known regions of the South[2].

Pliny's statement[3] that " the Upper part of Egypt, towards Arabia, produces a shrub which some call Gossypion, and others Xylon " is well known, and the opinion expressed by Prosper Alpinus[4] that cotton was not grown in Egypt proper, but was imported from abroad, is generally believed to be correct.



Sketch of fabric, as it actually appears. (Straight weaving) x 10.

A lesser known inscription, which Dr. Reisner's discovery now confirms, is that found by Rüppell[5] in 1833 at Axum, in which an account of a raid on the Kasu or Meroitic Ethiopians by King Aeizanes is given. This king destroyed[6] " both towns of masonry and towns of grass huts, and sent expeditions up and down the Nile from the point of its junction with the Atbara. He seized their grain and their bronze, and their iron and their copper, and their implements for cultivating dura (?) and cotton " ! . . . . .

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[1] Probably modern Akik, see Crowfoot, J. W., "Some Red Sea Ports in the Anglo-Egyptian Sudan," Geographical Mag., May, 1911.

[2] An account of the trade with Ptolemais and the interior is given in "The Periplus of the Erythrean Sea" (c. A.D. 60), Schoff's translation, 1916.

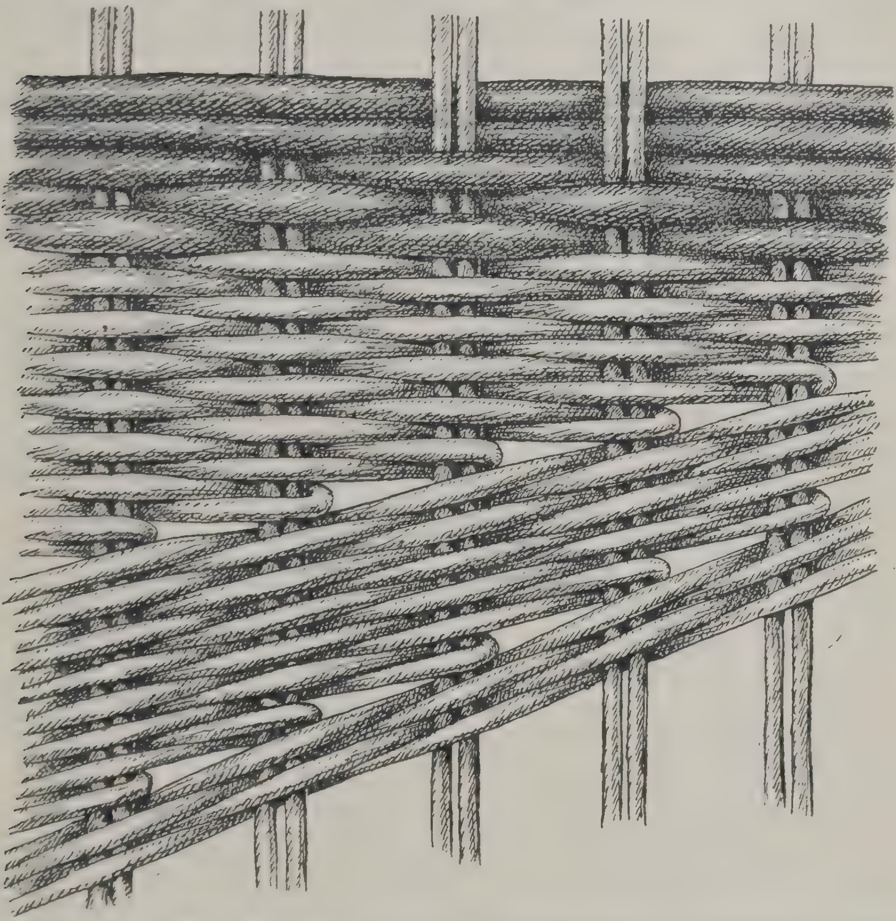
[3] "Historia Naturalis", Gaius Plinius Secundus (c. A.D. 23–79).

[4] "De Plantis Aegypti", Prosper Alpino, Venice, 1592.

[5] Littman, "Vorbericht der Deutschen Aksum—expedition ", Berlin, 1906.

[6] Crowfoot, J. W., "The Island of Meroé,' 19th Memoir of the Archeological Survey of the Egypt Exploration Fund, 1911.

The suggestion was put forward in 1911 by Crowfoot[6] that the cotton trade of Meroe may have been one of its most valuable assets at this period (c. B.C. 200–A.D. 200).



Diagrammatic sketch to shew method of weaving and changing direction (strands loosened) x 14.

VII.—MISCELLANEOUS NOTES.

MR. F. L. SQUIBBS, a member of the gardening staff of the Royal Botanic Gardens, has been appointed by the secretary of State for the Colonies, Assistant Superintendent, Botanical and Forestry Department, Hong Kong.

MR. J. PIRIE, a member of the gardening staff of the Royal Botanic Gardens, has been appointed by the Secretary of State for the Colonies, Agricultural Assistant, Gambia.

Borrer and Ralfs' Simple Triplet Microscope.—An interesting microscope which has been the property of three of the past generation of botanists has been presented to the Royal Botanic Gardens by Mr. C. V. B. Marquand. Its chief interest lies in the fact that it was the instrument with which John Ralfs, F.R.C.S., carried out the whole of his work for his well-known textbook, "British Desmidiaceae", published in 1848.

The microscope, which consists of a simple stand and a large series of lenses used as " water immersions ", was specially made for William Borrer, F.R.S., by Ross, the famous optical instrument maker, about the beginning of last century, and is referred to by Carpenter in one of the earlier editions of " The Microscope". It was originally contained in a mahogany case, but this was smashed on an occasion in Wales when Mr. Borrer's luggage was precipitated into the ravine through the coach colliding with a large boulder in the Pass of Llanberis.

As no notice of Borrer's life has hitherto appeared in the *Kew Bulletin*, it may be mentioned that he was born in 1781, and died at his birthplace, Henfield, Sussex, in 1862. His herbarium was presented to Kew, and is kept in the Keeper's Room separate from the general herbarium. Sir William Hooker, in recording the presentation by his widow in the " Report on the progress and condition of the Royal Gardens at Kew during the year 1862 ", describes the Herbarium as unquestionably the fullest and finest British collection in existence.

Borrer was elected a Fellow of the Royal Society in 1835. He was the author of a number of botanical papers, and was in particular a very large contributor to the Supplement to " English Botany ". Possessed of considerable means, he travelled a great deal in this country by road, and always took the microscope in question with him when he visited the West of England and Wales, as he took considerable interest in the cryptogamic flora.

On one of these occasions he met Ralfs, then quite a young man, and asked him to accompany him on the remainder of his tour. The microscope was constantly employed, and Ralfs made even more use of it than its owner. When they parted at Bangor Borrer pressed Ralfs to accept it.

The present donor inherited it from his father, Mr. E. D. Marquand, who had long been associated with Ralfs, and to whom the latter presented it on December 5th, 1883, not long before his own death at the age of 83. Mr. Marquand made a note of the exact words, which were as follows :—" I want you to accept this little microscope of mine as a memorial of me when I am gone. I had intended to leave it to you at my death, but I may just as well have the pleasure of giving it to you now. You must remember that it was with it that I did the whole of my work, all my papers and my Desmids, so you see it has a history ".

The Botanical Magazine.—The following plants are figured in Part I. of Volume CXLIX :—*Phytolacca clavigera* W. W. Smith (t. 8978), from a specimen raised at Edinburgh from an odd lot of seed amongst the collections of G. Forrest, from Yunnan ; *Maxillaria chrysantha* Barb. Rodriguez (t. 8979), which has been in cultivation at Glasnevin for some years as *M. Galeottiana*, and has only recently been determined ; *Viburnum Davidii* Franch. (t. 8980), from China, with dark green foliage forming a striking contrast to the white flowers and bluish fruits ; *Candidea stenostegia* Stapf (t. 8981), a new species described from specimens raised at Edinburgh from Northern Nigerian seed ; *Caralluma pseudo-N. E. Brownii* Dinter (t.8982), an elegant plant with blackish-brown flowers, from great Namaqualand, communicated by Mr. Elwes ; *Rhododendron Thayerianum* Rehder and Wilson (t. 8983), a charming plant from Western Szechuan, contributed by Mr. J. C. Williams ; *Turraea floribunda* Hochst. (t. 8984), a deliciously scented shrub from Natal, flowered at Kew ; *Sempervivella alba* Stapf (t. 8985), a pretty little plant from India, grown by Mr. Elwes ; *Primula calciphila* Hutchinson (t. 8986), an interesting Chinese plant, from Ichang ; *Tecophilaea cyanocrocus* Leyb. (t. 8987), a beautiful dark blue and white flowered bulb from Chile ; *Rhododendron lacteum* Franch. (t. 8988), from the mountains of Yunnan ; *Cyclamen balearicum* Willk. (t. 8989), with small delicately-coloured flowers, only known from the Balearic Islands.

Diseases of Crops in the West Indies.*—This volume covers far more than is suggested by its modest title. As stated in the "Foreword" by Professor J. B. Farmer, the work constitutes "a real landmark of progress in the science of the plant considered in relation to health and disease."

While dealing specially with the diseases of crops grown in the West Indies, the work is a lucid and broad presentation of the principles of plant pathology, founded on the text that the economic mycologist "is being compelled by the general trend of experience to be an agriculturist." The author's conviction is that the incidence of disease is, particularly in tropical countries, influenced fundamentally by agricultural practice—a view which was shared by the late C. O. Farquharson for conditions in Nigeria. (See *Kew Bull.*, 1918, p. 354.)

This broad connected outlook binds together a mass of information as to the various problems dealt with, derived both from personal experience and from the thorough consideration of recent literature.

The book is divided into two parts. The first part (114 pages) deals with the nature and classification of plant diseases and the principles of control. Chapters are given on diseases due to fungi, those caused by bacteria, infective viruses, nematodes, phanerogamic parasites, and non-parasitic diseases. There is also included a useful summary of our knowledge as to relations between insects and disease, and some account of entomogenous fungi. Under the heading of "Control" the properties and uses of various fungicides are explained, and the general method given of treating certain classes of disease, such as wood-rots, damping-off, etc.

The second part of the book (248 pages) is prefaced by an account of agricultural conditions in the Lesser Antilles.

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* Diseases of Crop Plants in the Lesser Antilles, by W. Nowell. Published on behalf of the Imperial Department of Agriculture by the West India Company, London. 1923. pp. 383 ; figs. 150. Price 12s. 6d.

Following this are three sections, the first dealing with some general diseases which are common to various crops, the second with diseases of permanent crops such as Cacao, Coconut, Hevea, etc., and the third with diseases of arable crops.

Copious illustrations from photographs and line drawings are supplied, and the book is clearly printed and light to handle.

A. D. C.

Diseases of Glasshouse Plants.*—As Director of the Cheshunt Experimental and Research Station, Dr. Bewley has had unrivalled opportunities for studying the diseases of such crops as tomatoes and cucumbers grown intensively and on a large scale, and of utilising the specialised practical knowledge of a body of keen and up-to-date growers. Of these opportunities Dr. Bewley has taken full advantage, and the present book is the outcome.

As stated in the preface the object of the book is "to bring before growers of glasshouse plants the fundamental principles of disease control." In pursuance of this aim, Dr. Bewley starts with a chapter on the general construction and sanitation of glasshouses, followed by a second on the various environmental conditions which may predispose plants to disease. Chapters 3—7 deal in detail with special diseases of various plants, classified as Root diseases, Wilt diseases, Stem, Leaf and Fruit diseases, Bacterial diseases, and Mosaic diseases. Naturally the greater part of this section refers to diseases of Tomatoes and Cucumbers but mention is made also of some of those other plants, such as Rose, Carnation, Chrysanthemum, bulbous plants, etc. The concluding chapters are occupied with a general consideration of the treatment of plant diseases, including such questions as soil sterilisation, spraying and dusting, and plant hygiene.

In any future edition the utility of the book could be improved by careful scrutiny of the citations, both of references and of names. Reference to a systematic mycologist would obviate such confused citations as "Diplodina lycopersici Cooke, Holtos emend., Brooks & Searle" (p. 89).

E. M. W.

University Botanic Garden, Tokyo.—We have received an interesting little Guide to the Botanic Garden of the Imperial University of Tokyo, Japan, printed in English. From it we gather that the garden covers an area of about 45 acres, and has developed from a medicinal garden established nearly two hundred years ago. This Guide furnishes a plan of the garden, and gives an account of its main features as well as of the most interesting trees and plants to be seen. It is illustrated by fourteen reproductions of photographs. No price is stated.

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* "Diseases of Glasshouse Plants," by W. F. Bewley, D.Sc. Published by Ernest Benn, Ltd., 8, Bouverie Street, E.C. 4. 1923. Price 12s. 6d. net.

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ROYAL BOTANIC GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

No. 3] [1924

VIII.—CONTRIBUTIONS TO THE FLORA OF SIAM.*

ADDITAMENTUM XIV.

W. G. CRAIB.

Monocarpia siamensis *Craib* [Anonaceae-Unoneae] ; a *M. euneura* Miq., partibus novellis et petalis pilis parvis stellatis instructis, foliorum nervis multo minus prominentibus, pedicellis longioribus, fructu breviter sed distincte stipitato recedit.

Caules lignosi, volubiles (ex *Kerr*), primo pilis parvis brunneis stellatis parce instructi, cito glabri, fusco-brunnei, brunnei, vel rarius cinereo-brunnei, cortice reticulato-striato hic et illic transverse rupto obtecti, lenticellis subconspicuis. *Folia* oblongo-oblanceolata vel oblonga, apice breviter obtuse acuminata, basi rotundato-acuminata vel cuneata, ad 13 cm. longa et 4·8 cm. lata, rigide chartacea, sicco brunnescentia, matura glabra vel subtus pilis stellatis parvis hic et illic ad nervos instructa, costa supra impressa subtus prominente, nervis lateralibus utrinque 9–14 intra marginem anastomosantibus supra conspicuis subtus prominulis, nervulis rete gracile subtus subprominulum efficientibus, petiolo 5–7 mm. longo supra canaliculato pilis stellatis parvis parce instructo suffulta. *Flores* solitarii, oppositifolii, pedicellis 2–3·5 cm. longis basi bracteis deciduis instructis pilis parvis ferrugineis stellatis instructis suffulti. *Sepala* oblata, apice leviter obtuse acuminata, 5 mm. longa, 5·5 mm. lata, coriacea, cum petalis extra pilis parvis stellatis brunneis instructa, intra basi excepta puberula et parum granulosa, ciliata. *Petala* exteriora 2·4 cm. longa, 8·5 mm. lata, interiora exterioribus subaequilonga, circa 6 mm. lata. *Stamina* 2·25 mm. longa, filamentis vix 0·5 mm. longis inclusis, connectivo apice truncato. *Receptaculum* conicum, 1·25 mm. altum, glabrum. *Ovarium* e carpello unico plurisulcato 1·75 mm. alto densius albo-stellato-pubescente constitutum ; stigma subsessile, 3 mm. diametro :

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* Continued from *K.B.* 1922, p. 225.

12. 1,000. 4/24. Wy. & S., Ltd. Gp. 50. (4.)

ovula circa 8. *Carpellum* maturum stipite brevi incluso circa 1·8 cm. longum et 1 cm. diametro, verruculosum, ferrugineo-furfuraceum.

Kampêng Pêt, Mê Lamung, c. 600 m., on limestone rocks, *Kerr* 6087.

Polyalthia rufa *Craib* [Anonaceae-Unoneae]; a *P. obliqua* Hook. f. et Th., ramulis dense subferrugineo-pubescentibus, pilis haud adpressis, foliis brevioribus, calyce extra dense ferrugineo-subhirsuto, petalis dorso pilis ferrugineis adpressis sparse vel subsparse instructis haud sericeis inter alia recedit.

Frutex circa 1·5 m. altus (ex *Kerr*); ramuli graciles, primo dense subferrugineo-pubescentes, demum glabri, cortice fusco rarius cinereo obtecti, lenticellis inconspicuis. *Folia* oblongo-lanceolata, oblongo-oblanceolata, rarius oblongo-ovata vel lanceolata, apice obtusa vel acutiuscula, basi inaequilateralia, cordatula, 4–9 cm. longa, 1–3·6 cm. lata, chartacea, supra glabra, rarissime ad costam pilis sparsis instructa, subtus pallidiora, pilis ferrugineis subparce instructa, nervis lateralibus utrinque 8–10 bene intra marginem anastomosantibus supra obscuris vel subobscuris subtus prominulis, nervulis subtus parum prominulis, margine recurva, petiolo circa 3 mm. longo indumento ei ramulorum simili tecto suffulta. *Flores* solitarii, supra-axillares, e ramulis foliatis vel defoliatis orti, pedicellis ad 2 mm. longis dense ferrugineo-subhirsutis suffulti. *Sepala* ovata, obtusa, basi parum connata, 4 mm. longa, 2·75 mm. lata, extra dense ferrugineo-subhirsuta, intra glabra. *Petala* 6, inter se subaequilonga, obtusa, 7 mm. longa, exteriora oblongo-lanceolata, circa 3·5 mm. lata, interiora lanceolata, circa 3 mm. lata, omnia dorso parce adpresse ferrugineo-pubescentia, intra glabra vel apice pilis paucis ferrugineis instructa. *Stamina* 1·25 mm. alta, filamentis brevibus, connectivo producto truncato concavo. *Carpella* circa 10, longius adpresse pubescentia, 1·25 mm. alta, stylo brevi, stigmate 0·75 mm. lato pilis paucis divergentibus sat rigidis instructo, ovalis 2 basalibus.

Nakawn Sawawn, Mê Wong, c. 100 m., evergreen forest, *Kerr* 6022.

Saccopetalum lineatum *Craib* [Anonaceae-Miliuseae]; ab affini *S. longifloro* Hook f. et Th., floribus minoribus, stylo breviore crassiore recedit.

Arbor 15–20 m. alta (ex *Kerr*); ramuli novelli dense fulvo-pubescentes vel tomentoso-pubescentes, demum glabrescentes, cortice brunneo, rubro-brunneo vel cinereo-brunneo reticulato-striato tecti, pauci-lenticellati. *Folia* (maturis deficientibus) iuvenilia oblonga, oblongo-lanceolata, vel oblongo-oblanceolata, apice acute vel subacute acuminata vel subacuminata, basi parum inaequilateralia, truncata, rotundata, vel cordatula, ad 6·5 cm., longa et 2·7 cm. lata rigide chartacea, supra ad costam densius breviter pubescentia, aliter glabrescentia, primo parce pubescentia, subtus primo dense pubescentia vel tomentoso-pubescentia, cito ad costam nervosque laterales pubescentia, aliter parce pubescentia, nervis lateralibus utrinque circa

12 intra marginem anastomosantibus supra conspicuis vel subconspicuis subtus prominulis, reticulatione subtus subconspicua, margine integra, petiolo circa 2 mm. longo indumento ei ramulorum simili tecto suffulta. *Flores* virides, petalis interioribus intra rubro-lineatis (ex *Kerr*), ex axillis foliorum delapsorum orti, solitarii vel gemini, pedunculo communi brevi vel perbrevi, pedicellis circa 5 mm. longis fulvo-tomentosis. *Sepala* oblongo-lanceolata, obtusa, 4·5 mm. longa, 2 mm. lata, utrinque breviter pubescentia, ciliata. *Petala* exteriora sepalis similia sed paulo longiora et angustiora, interiora 2–2·5 cm. longa, 7·5 mm. lata, basi saccata, utrinque pubescentia sed intra medio glabra vel puberula. *Stamina* circa 4–seriata, filamentis brevibus inclusis 1 mm. longa, connectivo paululo producto loculos haud obtegente. *Receptaculum* hirsutum. *Ovarium* e carpellis circa 14 constitutum ; carpella 1·25 mm. alta, pubescentia, stigmate circa 0·8 mm. longo, stylo brevi, ovulis 7.

Nakawn Sawawn, Mê Wong, c. 100 m., evergreen forest, *Kerr* 6012.

Vern. I rêt (ex *Kerr*).

Alsodeia (**Prosthesia**) **immersa** *Craib* [Violaceae-Alsodeieae] ; species foliis nisi pagina inferiore in nervorum axillis glabris, inflorescentia axillari petiolo subaequilonga, capsula glabra parum verrucosa distincta.

Frutex circa 1·5 m. altus (ex *Kerr*) ; ramuli primo plus minusve puberuli, mox glabrescentes, luteo-viridi-corticati, lenticellis vix conspicuis. *Folia* lanceolata, oblongo-lanceolata, vel oblongo-oblanceolata, apice obtuse acuminata, basi cuneata, usque ad 14 cm. longa et 5 cm. lata, chartaceo-coriacea, supra glabra, subtus in nervorum axillis pilosa, aliter glabra, nervis lateralibus utrinque circa 10 pagina utraque prominulis, nervulis gracilibus pagina utraque subprominulis, margine leviter serrulata, petiolo ad 1 cm. longo supra canaliculato puberulo suffulta ; stipulae deciduae, circa 6 mm. longae, lineari-lanceolatae, acute acuminatae, ciliatae, costatae. *Inflorescentiae* axillares, petiolis subaequilongae, pedicellis circa 4 mm. longis, bracteis parvis deciduis. *Sepala* ovata, acute acuminata, dorso apice carinata, 2·5 mm. longa, 2 mm. lata, extra adpresse pubescentia, ciliata. *Petala* alba (ex *Kerr*), oblonga, apice rotundata obtusave, parum recurva, 3·5 mm. longa, 1·75 mm. lata, unicostata, costa intra prominente. *Discus* 0·5 mm. altus. *Filamenta* 0·5 mm. longa, loculis vix 1 mm. longis, appendice apicale circa 0·3 mm. longa, appendice membranacea deltoidea 0·75 mm. alta. *Ovarium* glabrum, disco vix aequialtum, stylo 1·75 mm. longo glabro. *Capsula* subglobosa ad 7 mm. diametro, glabra, parum verrucosa, perianthio persistente, stylo persistente vel deciduo.

Nakawn Sawawn, Mê Wong, evergreen forest, c. 100 m., *Kerr* 6011 ; Klawng Kung, evergreen forest, c. 100 m., *Kerr* 6011A.

Corydalis siamensis *Craib* [Fumariaceae]; species radice cylindrica elongata, foliis ternatis, ramulis floriferis foliatis, bracteis pedicellis subaequilongis, corolla alba apice punicea cognoscenda.

Radix elongata, cylindrica. *Folia* ambitu triangularia vel late triangularia, bi- vel tri- ternata, 1-5 cm. longa, 2-10 cm. lata, membranacea, glabra, subtus pallidiora vel subglauca, petiolo ad 12·5 cm. longo suffulta; segmenta ultima anguste flabelliformia, basi cuneata, 3-lobata, lobis integris vel 3-lobulatis, lobulis rotundatis apiculatis, e basi 3-nervata. *Ramuli* floriferi axillares, ad 11 cm. alti, simplices vel ramosi, paucifoliati. *Bracteae* trilobatae, pedicellis longiores vel iis subaequilongae; pedicelli 3–4 mm. longi. *Sepala* orbicularia, fimbriata, vix 1·25 mm. diametro. *Corolla* alba, apice punicea (ex *Kerr*), 19 mm. longa, calcare petalis subaequilongo, petalo calcarato elliptico 8 mm. longo 5 mm. lato, altero exteriore oblongo-oblanceolato. *Pistillum* 9 mm. altum, glabrum, stylo ovario paulo longiore. *Fructus* stylo persistente incluso 17 mm. longus, valvis tenuibus, suturis persistentibus, seminibus nigris nitidis laevibus.

Doi Chiengdao, in crevices of limestone rocks, c. 1900 m., *Kerr* 6582.

Garcinia McKeaniana *Craib* [Guttiferae-Garcinieae]; a *G. paniculata* Roxb. floribus masculis ovarii rudimento evoluto recedit.

Arbor circa 12 m. alta (ex *Kerr*); ramuli fuscescentes, primo hic et illic parcissime puberuli, cito glabri, cortice striato-reticulato. *Folia* oblongo-elliptica, oblongo-lanceolata, vel oblongo-obovata, apice breviter acuminata, basi cuneata, usque ad 19 cm. longa et 7·5 cm. lata, coriacea, sicco supra fuscescentia, subtus pallidiora, glabra, costa supra conspicua interdum parum impressa subtus prominente, nervis lateralibus sat distantibus utrinque 10–12 supra conspicuis saepe impressis subtus prominentibus intra marginem haud furcatis, nervulis numerosis inter se parallelibus pagina utraque conspicuis vel subconspicuis, pellucido-punctata et subtus parce nigro-lineata, margine recurva, petiolo ad 1·5 cm. longo suffulta. *Flores* masculi in paniculas terminales vel ramulos breves axillares bifoliatos terminantes multifloras circa 8–9 cm. longas et 8–10 cm. latas pedunculo communi circa 2 cm. longo suffultas dispositi; pedunculi partiales infimi 2 cm. longi, supremi 1 cm. longi; pedicelli 2 mm. longi, basi articulati. *Sepala* 4, duo exteriora late ovata, 3·5 mm. longa, 4 mm. lata, interiora oblata, 3·5 mm. longa, 5·5 mm. lata, omnia apice rotundata, glabra. *Petala* 4, ad 7·5 mm. longa et 4·5 mm. lata. *Stamina* ad apicem receptaculi cupuliformis posita, fasciculis 4 subdistinctis e staminibus circa 10 constitutis, antheris longitudinaliter dehiscentibus, connectivo crasso supra loculos producto truncato. *Ovarii* rudimentum liberum, 1·75 mm. altum, staminibus subaequialtum, glabrum, columnare, basi parum tumidum.

Doi Sutep, 1200–1550 m., evergreen jungle, *Kerr* 3504, 3470.

Garcinia plena *Craib* [Guttiferae-Garcinieae] ; a *G. fusca* Pierre et *G. Schomburgkiana* Pierre floribus masculis ovarii rudimento evoluto recedit.

Arbor circa 15 m. alta (ex *Kerr*) ; ramuli fusco-corticati, glabri, primo quadrangulares. *Folia* oblanceolata vel obovato-oblanceolata, apice acuminata, basi cuneata, 7·5–12·5 cm. longa, 3–5·5 cm. lata, chartacea vel rigide chartacea, glabra, nervis lateralibus utrinque circa 10 intra marginem anastomosantibus, aliis parum tenuioribus additis, omnibus supra subprominulis subtus conspicuis vel subconspicuis, margine revoluta, petiolo 10–13 mm. longo supra canaliculato suffulta. *Flores* masculi fasciculati, et laterales et terminales, fasciculo quoque e floribus circa 8 constituto ; pedicelli ad 8 mm. longi, angulati, basi bracteati ; alabastra globosa, floribus apertis deficientibus. *Sepala* 4, obovato-elliptica vel elliptica, 4 mm. longa et lata. *Petala* 4. *Receptaculum* convexum. *Antherae* longitudinaliter dehiscentes. *Ovarii* rudimentum ad apicem receptaculi situm, glabrum, stigmate pyramidale.

Nan, Ban Tiu, c. 1100 m., evergreen forest, *Kerr* 5007.

Garcinia propinqua *Craib* [Guttiferae-Garcinieae] ; a *G. anomala* Pl. et Tr. foliis minoribus minus coriaceis, floribus masculis numerosioribus multo minoribus pedunculo communi longiore suffultis, sepalis haud coriaceis, ovarii rudimento apice plano recedit.

Arbor circa 8 m. alta (ex *Kerr*) ; ramuli sicco viridi-lutei, iuventute puberuli, quadrangulares. *Folia* late lanceolata vel oblongo-lanceolata, apice obtuse breviter acuminata, basi cuneata vel rotundato-cuneata, ad 11·5 cm. longa et 4·5 cm. lata, membranaceo-coriacea, glabra, nervis lateralibus utrinque circa 16–18 aliis fere aequalibus interpositis supra plus minusve conspicuis subtus prominulis intra marginem anastomosantibus, nervulis vix conspicuis, margine anguste cartilaginea, recurva, petiolo 3–6 mm. longo supra canaliculato suffulta. *Inflorescentiae* masculae ex axillis foliorum delapsorum ortae, pedunculo communi 7–13 mm. longo puberulo suffultae, e floribus circa 9 constitutae, pedicellis circa 6 mm. longis basi bracteatis umbellatim dispositis. *Sepala* 4, membranacea, sub anthesin reflexa, 3·5 mm. longa, exteriora interioribus latiora. *Petala* 4, oblongo-cuneiformia, 5·5 mm. longa, 3·5 mm. lata. *Receptaculum* cupuliforme, stamina extra et apice gerens. *Filamenta* brevia, antheris oblongis longitudinaliter dehiscentibus 2-locularibus recurvis. *Pistillodium* stamina paululo superans, apice latum, parum convexum.

Doi Chiengdao, c. 1500 m., dense evergreen forest, *Kerr* 5611.

Calophyllum Smilesianum *Craib* [Guttiferae-Calophylleae] ; a *C. polyantho* Wall., partibus omnibus haud glabris, a *C. Thorelii* Pierre, floribus minoribus, stylo multo breviore recedit.

Arbor circa 25 m. alta (ex *Kerr*) ; ramuli iuventute griseo-puberuli vel fere glabri, quadrangulares, rubro-brunneo-corticati, mox omnino glabri, teretes, cortice plus minusve fuscescente, lenticellis vix conspicuis angustis longitudinaliter extensis; ramulorum alabastra et terminalia et axillaria elongata, dense griseo-puberula. *Folia* oblongo-elliptica, elliptico-ovata, vel rarius lanceolata, apice subacuminata, obtusa vel subacute indurato-apiculata, basi acuminata, 5·5–9·5 cm. longa, 2·5–4·3 cm. lata, coriacea, subtus pallidiora, matura glabra, costa subtus prominente, nervis numerosis pagina utraque prominulis sed superiore paululo magis elevatis, margine anguste cartilaginea, paulo recurva, petiolo 1–2 cm. longo apice pagina decurrente alato supra late canaliculato maturo glabro suffulta. *Flores* albi (ex *Kerr*), in racemos axillares et in paniculas terminales foliis paulo breviores dispositi; pedunculi communes breves vel subnulli, cum rhachide pedunculis partialibus et pedicellis densius ferrugineo-puberuli vel fere furfuracei; pedicelli 4–7 mm. longi. *Sepala* 4, exteriora inter se inaequalia. quoad formam variabilia, oblongo-ovata, late elliptica, vel rarius obovata, usque ad 2·5 mm. longa et 2·75 mm. lata, interiora obovata vel elliptico-obovata, circa 4·5 mm. longa, omnia apice rotundata, ciliata, exteriora dorso puberula, interiora dorso ima basi puberula vel fere glabra. *Petala* obovata, apice rotundata, circa 5·5 mm. longa et 4 mm. lata, ciliata. *Filamenta* 3·5 mm. longa, basi distincte plus minusve connata, antheris oblongis apiculatis 1 mm. longis. *Ovarium* glabrum, 1·75 mm. altum, stylo saepissime delapso ovario subaequilongo.

Dan Sui, Kao Keo Kang, c. 1300 m., evergreen forest, *Kerr* 5792.

var. **lutea** *Craib*, a typo foliis magis oblongis, ramulis iuventute luteis indumento simili sed copiosiore tectis, inflorescentia longiore recedit. *Fructus* ambitu oblongo-ellipticus vel ellipticus, apiculatus 2·7–3·5 cm. longus, 1·9–2·5 cm. latus.

Doi Pahom Pok, c. 1600 m., evergreen forest, *Kerr* 5180.

Calophyllum Williamsianum *Craib* [Guttiferae-Calophylleae]; a *C. Thorelii* Pierre, floribus minoribus, a *C. polyantho* Wall., foliis multo maioribus recedit.

Arbor circa 15–20 m. alta (ex *Kerr*); ramuli quadrangulares. novelli sicco fusci. dein lutescentes, primo puberuli, cito glabri. *Folia* oblonga vel oblongo-lanceolata, apice obtuse acuminata. basi subacuminata vel acuminato-cuneata. 9–19 cm. longa, 4·5–6·5 cm. lata, coriacea, iuvenilia pagina utraque ad costam parce puberula. aliter glabra, matura omnino glabra. costa subtus prominente. nervis lateralibus numerosis pagina utraque prominulis sed inferiore paululo magis elevatis. margine anguste cartilaginea, petiolo 12–17 mm. longo transverse corrugato supra conspicue canaliculato primo lateraliter puberulo mox glabro suffulta. *Flores* albi (ex *Kerr*). in racemos axillares et paniculas terminales foliis subaequilongas dispositi; pedunculus communis subnullus vel ad 5 cm. longus. cum rhachide pedunculis partialibus et pedicellis densius ferrugineo-puberulus; pedicelli 6–12 mm. longi. *Sepala* exteriora plus minusve rotundata. ad 2·5 mm. longa et 3 mm. lata. ciliata. dorso ferrugineo-puberula. interiora 7 mm. longa. subglabra vel extra distincte puberula, ciliata. *Petala* 9 mm. longa, ciliata. *Filamenta* circa 3·5 mm. longa, basi connata; antherae oblongae, 1·75 mm. longae, apiculatae. *Ovarium* glabrum, 1·75 mm. altum; stylus fere 4 mm. longus, superne gradatim incrassatus, stigmate peltato.

Nan, Doi Tiu, c. 1100 m., evergreen forest, *Kerr* 5038.

Gordonia Dalglieshiana *Craib* [Ternstroemiaceae-Gordonieae]: foliis coriaceis apicem versus denticulatis breviter petiolatis, floribus maioribus distincta.

Arbor 8–10 m. alta (ex *Kerr*); ramuli primo adpresse pubescentes, mox glabri, cortice brunneo, cinereo-brunneo vel cinereo obtecti, lenticellis inconspicuis. *Folia* oblongo-lanceolata, oblongo-oblanceolata, vel oblanceolata, apice obtusa, haud rarius retusa, saepe subacuminata, rarissime longius acuminata, basi cuneata, 6–14 cm. longa, 2·5–4·5 cm. lata, coriacea, sicco supra viridia vel viridi-lutescentia, subtus pallide viridia, supra glabra vel ad costam interdum pubescentia, subtus iuventute medium versus densius sericea, matura glabra vel pilis adpressis inconspicuis hic et illic instructa, nervis lateralibus utrinque circa 10 bene intra marginem anastomosantibus pagina utraque subobscuris vel plus minusve conspicuis interdum inferiore prominulis, subintegra vel saepius apicem versus denticulata, petiolo 4–8 mm. longo supra conspicue canaliculato plus minusve pubescente suffulta. *Flores* albi (ex *Kerr*), axillares, solitarii, ad 6·5 cm. diametro; bracteae deciduae. *Sepala* bracteis similia sed gradatim maiora, coriacea, brunnea, ovato-rotundata vel late ovata, usque ad 1·2 cm. longa et 9 mm. lata, persistentia, cum bracteis dorso basi adpresse pubescentia et apice rotundata. *Petala* obovata vel cuneato-obovata, extra basi sparse breviter adpresse albo-pubescentia. *Stamina* lutea (ex *Kerr*), basi breviter connata et petalis adnata, glabra, 1·5 cm. longa, antheris circa 2 mm. longis. *Ovarium* 3 mm. altum, dense adpresse pubescens, stylo 1·3 cm. longo sulcato superne glabro inferne adpresse pubescente. *Capsula* lignosa, ad 3·5 cm. longa, plus minusve adpresse pubescens, valvis dorso basi rotundatis apice sulcatis. *Semina* brunnea, nitida, circa 1 cm. longa, alis stramineo-brunneis subaequilonga.

Doi Sutep, c. 1600 m., evergreen jungle, *Kerr* 4680 A (type). Doi Pa Kao, c. 1300 m., evergreen forest, *Kerr* 5378. Doi Angka, Pä Ngêm, c. 2100 m., on open ridge, *Kerr* 6309.

Pyrenaria Garrettiana *Craib* [Ternstroemiaceae-Gordonieae], ab affini *P. camelliiflora* Kurz, ramulis primo dense pubescentibus foliis supra haud glabris subtus haud ad costam tantum pubescentibus, floribus maioribus distincte pedicellatis recedit.

Arbor ad 8 m. alta (ex *Kerr*); ramuli primo densius pubescentes, mox breviter crispatim pubescentes, brunneo- vel cinereo-brunneo corticati. *Folia* oblongo-oblanceolata vel lanceolata, apice obtuse acuminata, basi cuneata, 9–15 cm. longa, 3–5·5 cm. lata, subcoriacea, sicco lutescentia, supra ad costam densius pubescentia, aliter parce pubescentia, demum ad costam tantum pubescentia, subtus sed ad costam densius molliter piloso-pubescentia, nervis lateralibus utrinque 8–10 rectis vel subrectis bene intra marginem anastomosantibus supra conspicuis subtus prominulis, nervulis subtus prominulis, margine parte triente basali excepta denticulata, parum recurva, petiolo ad 1 cm. longo indumento ei ramulorum simili tecto suffulta. *Flores* albi (ex *Kerr*), solitarii, axillares, pedicello circa 5 mm. longo ut ramulis pubescente suffulti ; bracteolae 2, oblongae vel oblongo-lanceolatae, obtusae, inter se parum inaequales, circa 10 mm. longae et 4 mm. latae, virides, unicostatae, dorso pubescentes, intra parcius pubescentes, ciliatae. *Sepala* 5, bracteolis subsimilia. *Petala* basi breviter coalita, usque ad 1·8 cm. longa et 1·2 cm. lata, extra adpresse pubescentia, intra glabra. *Stamina* lutea (ex *Kerr*), petalis dimidio breviora. *Pistillum* calyce paulo brevius, ovario 5-sulcato circa 4 mm. alto, stylis liberis approximatis circa 3 mm. altis cum ovario adpresse pubescentibus. *Fructus* ambitu obovatus, apice concavus, breviter stipitatus, 3·3 cm. altus, 2·3 cm. diametro.

Muang Fāng, Doi Pahom Pok, c. 1500–1600 m., evergreen forest, *Kerr* 5181.

Adinandra oblonga *Craib* [Ternstroemiaceae-Ternstroemieae]; species nova foliis minoribus plus minusve oblongis distincta.

Arbuscula circa 4 m. alta (ex *Kerr*) ; ramuli iuventute breviter sparse adpresse pubescentes, cito glabri, cortice brunneo vel cinereo-brunneo obtecti, lenticellis parvis rotundatis. *Folia* oblongo-elliptica, oblongo-ovata, vel fere elliptica, apice breviter obtuse acuminata, interdum emarginulata, basi cuneata vel rotundata, 4–8·5 cm. longa, 2·7–4·7 cm. lata, coriacea, sicco viridi-lutescentia, subtus pallidiora, supra glabra, subtus pilis sparsis adpressis inconspicuis instructa, saepe sparse glandulosa, nervis lateralibus utrinque circa 20 pagina utraque prominulis intra marginem anastomosantibus, reticulatione pagina utraque subprominula, costa supra conspicue impressa subtus prominente, petiolo 4–5 mm. longo supra canaliculato tenuiter adpresse pubescente suffulta. *Flores* solitarii, axillares, pedicellis mox recurvis circa 2 cm. longis sparse inconspicue adpresse pubescentibus mox superne conspicue gradatim incrassatis suffulti ; bracteae apicem versus pedicelli positae, cito deciduae. *Sepala* persistentia, ovata, oblongo-ovata, vel obovata, dorso exteriora sparsius, adpresse pubescentia, intra glabra, ciliata, ad 8 mm. longa et 6 mm. lata, accrescentia. *Petala* basi connata, ovato-lanceolata, subacuta, 11 mm. longa, 5 mm. lata, extra marginibus exceptis adpresse hirsuta, intra glabra. *Antherae* apiculo parce pubescente incluso vix 5 mm. longae, dorso adpresse pubescentes, filamentis 1·75 mm. longis apicem versus pubescentibus. *Ovarium* praesertim superne dense adpresse pubescens, stylo inferne adpresse pubescente apicem versus pilis paucis instructo.

Sukotai, Kao Luang, c. 1100 m., open grassy ground, *Kerr* 5923.

Pterospermum grande *Craib* [Sterculiaceae-Helictereae] ; a *P. acerifolio* Wall., cui florium magnitudine petalisque glabris approximat, sepalis haud reflexis, petalis latioribus inter alia recedit, a *P. diversifolio* Blume petalis latioribus glabris recedit.

Arbor circa 8 m. alta (ex *Kerr*), ramulis crassis iuventute dense albo- vel fulvo-tomentellis mox glabris cortice brunneo vel cinereo-brunneo obtectis. *Folia* oblonga, apice truncato-rotundata, triangulari-acuminata, basi rotundata, cordata, ad 33 cm. longa et 23 cm. lata, coriacea, supra nisi ad petioli insertionem et nervorum bases versus ubi tomentella glabra, subtus griseo-tomentella praetereaque pilis longioribus stellatis fulvis plus minusve deciduis instructa, nervis basalibus circa 12, nervis secondariis (e costa ortis) utrinque 6–8 omnibus supra parum impressis subtus prominentibus, nervis transversis inter se parallelis supra parum impressis subtus prominulis, nervulis supra hic et illic subconspicuis subtus prominulis, margine plus minusve undulata vel irregulariter lobulata, petiolo ad 6 cm. longo indumento nervorum ad 6 cm. supra laminae basem peltatim inserto suffulta. *Sepala* extra brunnea, intra pallide viridia (ex *Kerr*), lanceolata vel late lanceolata, basi plus minusve coalita, sicca ad 13·5 cm. longa et 2·5 cm. lata, crassa, extra brunneo-tomentosa, intra margine pallidius tomentella, medio pilis longiusculis fulvis plus minusve adpressis tecta. *Petala* alba (ex *Kerr*), sub-asciiformia, sicca 9·5 cm. longa, apicem versus 3 cm. lata, glabra, rigide papyracea. *Columna staminea* 1 cm. alta, antheris apiculatis 2·5 cm. longis. *Staminodia* petalis subaequialta, superne haud glabra. *Ovarium* fulvo-hirsutum, circa 1 cm. altum, stylo valido inferne fulvo-hirsutum.

Muang Pai, Doi Kiu Lom, c. 1500 m., open evergreen forest, *Kerr* 5497.

Shan name, Tawng Mawm (ex *Kerr*).

Pterospermum venustum *Craib* [Sterculiaceae-Helictereae]; ab affinioribus orientalibus petalis glabris ob flores minores recedit.

Arbor circa 25 m. alta (ex *Kerr*) ; ramuli graciles, iuventute pallide dense tomentelli praetereaque pilis stellatis ferrugineis plus minusve deciduis instructi, mox cortice brunneo reticulato obtecti. *Folia* saepissime oblongo-oblanceolata, rarius suboblonga, apice longius acuminata, subobtusa, basi conspicue inaequilateralia, latere altero cuneata, altero rotundata vel cuneato-rotundata, ad 15 cm. longa et 5 cm. lata, chartacea, supra costa hic et illic stellato-pubescente excepta matura glabra, subtus pallide dense tomentella et ad costam nervos laterales et transversos pilis ferrugineis stellatis instructa, aliter pilis iisdem ferrugineis sparsissime instructa, costa supra impressa subtus prominente, nervis lateralibus utrinque 10–12 intra marginem anastomosantibus supra parum impressis subtus prominentibus, nervis transversis inter se parallelis supra conspicuis vel subconspicuis subtus conspicuis, margine integra, interdum parum undulata, petiolo ad 8 mm. longo indumento ei ramulorum simili tecto suffulta ; stipulae cito deciduae, integrae, 7 mm. longae. *Flores* axillares, solitarii vel gemini, pedunculo communi perbrevi, pedicellis 0·4–1 cm.

longis ; bracteae fugaces. *Sepala* ad basem libera, linearia, circa 4 cm. longa et 2 mm. lata, extra albo-tomentosa et pilis stellatis ferrugineis plus minusve deciduis instructa, intra adpresse longius fulvo-pubescentia. *Petala* angusta, circa 2–2·7 cm. longa, plus minusve curvata, glabra. *Columna* staminea 8–9 mm. longa, glabra, staminodiis 2·5 cm. longis superne puberulis, filamentis 1 cm. longis, antheris acumine incluso 8 mm. longis sparse breviter pubescentibus. *Ovarium* 6 mm. altum, tomentosum, stylo 2 cm. longo basi tomentoso superne saepe torquato. *Fructus* valde immaturus, dense tomentosus, 5-angulatus vel fere alatus.

Nakawn Tai, c. 200 m., evergreen forest, *Kerr* 5873.

Reevesia siamensis *Craib* [Sterculiaceae-Helictereae] ; a *R. Wallichii* Br., foliis maioribus, nervis crassioribus et pedicellis multo magis robustis distinguenda.

Frutex circa 12 m. altus (ex *Kerr*) ; ramuli primo dense breviter stellato-tomentosi, cito glabrescentes, demum glabri, striati vel fere laeves, cortice rubro rubro-brunneo vel fusco obtecti, lenticellis conspicuis haud numerosis. *Folia* ovata vel oblongo-ovata, rarius oblonga vel oblongo-lanceolata, apice obtuse acuminata vel subacuminata, basi truncata, rotundata, vel minora plus minusve cuneata, ad 15 cm. longa et 7·7 cm. lata, rigide chartacea vel coriaceo-chartacea, sicco supra brunnescentia vel viridia, subtus viridia, supra glabra vel subglabra, subtus pilis parvis stellatis sparsis instructa, e basi trinervia praetereaque nervis 1–2 tenuioribus saepe additis, nervis secondariis (e costa ortis) utrinque 4–5 fere ad marginem anastomosantibus supra cum costa et nervis basalibus conspicuis subtus prominentibus, nervulis rete supra saepissime subconspicuum subtus prominulum efficientibus, margine integra, recurva, petiolo ad 3·5 cm. longo apicem versus breviter stellato-tomentoso aliter pilis similibus sparsius instructo suffulta ; stipulae deciduae, cicatricibus parvis. *Inflorescentiae* generis, ramulos foliiferos terminantes, e corymbis racemosim dispositis constitutae, corymbis pedunculo communi 7–17 mm. longo suffultis, pedicellis circa 7 mm. longis sub apicem articulatis, partibus omnibus pilis parvis stellatis magis minusve dense instructis ; bracteae deciduae. *Calyx* campanulatus, ad 6·25 mm. longus, extra breviter stellato-pubescens, intra glaber, lobis ovatis obtusis vel subquadratis breviter obtuse acuminatis circa 1·75 mm. longis. *Petala* decidua. *Columna* staminea 2–2·5 cm. longa, glabra, apice 5-lobata. *Ovarium* 1 mm. altum, stylo 0·5 mm. alto cum ovario stellato-pubescente. *Fructus* haud maturus densius breviter stellato-tomentosus, 10-sulcatus.

Kao Keo Kang, Dan Sai, c. 1300 m., edge of clearing in evergreen forest, *Kerr* 5797.

Helicteres vinosa *Craib* [Sterculiaceae-Helictereae] : species nova foliis subtus densius molliter pubescentibus, inflorescentia glandulifera, floribus inter maiores distinguenda.

Frutex circa 1·5 m. altus : ramuli dense molliter pubescentes vel subhirsuti, pilis primo pallidis mox brunnescentibus. *Folia* saepissime elliptico-oblonga, apice saepius acuminata, acuta obtusave, basi cordata, rarius rotundata, saepius inaequilateralia, usque ad 15 cm. longa et 9·5 cm. lata, chartacea, supra viridia, pilis albis stellatis subrigidis tecta, subtus pallida, pilis stellatis longioribus et mollibus obtecta, e basi 5–7-nervia, nervis secondariis (e costa ortis) 4–6, omnibus supra conspicuis subtus prominentibus, nervulis supra parum impressis subtus prominulis, margine irregulariter denticulata, petiolo ad 1·5 cm. longo indumento ei ramulorum simili tecto suffulta; stipulae deciduae, subulatae, circa 1 cm. longae. *Spicae* in foliorum superiorum axillis positae, petiolis paulo longiores, breviter pedunculatae, pedunculo rhachi bracteis et alabastris indumento ei ramulorum simili tectis; bracteae deciduae, angustae, circa 5 mm. longae; alabastra acuminata, glandula solitaria sessili nitida glabra ad floris cuiusque basem. *Calyx* 2 cm. longus, extra pilis stellatis obtectus, tubo apicem versus intra adpresse pubescente, lobis intra pubescentibus, basi antice parum gibbosus, lobis deltoideis, antico 2 mm. longo 1·75 mm. lato lateralibus paulo maiore, duobus posticis 4 mm. longis 2·25 mm. latis elongato-deltoideis haud reflexis. *Petala* 2·7 cm. longa, 5–6·5 mm. lata, apice retuso-truncata, ciliata, paulo infra medium lobulos duos laterales gerentia, limbis pilis brevibus subsparse tectis. *Androphorum* 1·8 cm. longum, paulo supra basem fere ad apicem sed ibi parcius unilateraliter pubescens; staminodia petaloidea, filamentis subaequialta. *Ovarium* 1·25 mm. altum, parce breviter pubescens, stylo 2 mm. longo glabro. *Fructus* 5 cm. longus, indumento incluso 1·4 cm. diametro, stellato-pubescens et processibus sat rigidis longiusculis pilos stellatos gerentibus tectus, gynophoro 2 cm. longo calyce persistente saepissime cincto suffultus; semina quadrangularia, faciebus planis pallide brunneis, atro-notata.

Nakawn Tai, c. 200 m., mixed deciduous jungle, flowers vinous, *Kerr* 5846.

Dalbergia Marcaniana *Craib* [Leguminosae-Dalbergieae]; ab affini *D. menoeide* Prain, habitu, bracteolis latioribus, petalorum basibus diversis inter alia recedit.

Suffrutex circa 0·5 m. altus (ex *Kerr*); ramuli iuventute pilis paucis adpressis ferrugineis instructi, cito glabri, annotini sicco brunnei, longitudinaliter striati, hornotini brunneo-cinerei, lenticellis elevatis conspicue notati. *Folia* 3–5-foliolata, petiolo communi 2–4·5 cm. longo sparse adpresse pubescente suffulta; foliola ovato-lanceolata vel lanceolata, apice acuta obtusave, mucronulata, basi rotundata vel cuneato-rotundata, 4·5–10·5 cm. longa, 2–4·5 cm. lata, chartacea vel rigide chartacea, supra glabra, subtus pallidiora, pilis brevibus adpressis sparse tecta, nervis lateralibus utrinque 8–10 bene intra marginem anastomosantibus sicco supra conspicuis subtus prominulis, nervulis supra plus minusve conspicuis subtus rete gracile conspicuum efficientibus, margine recurva, petiolulis 2–3 mm. longis pubescentibus suffulta; stipulae deciduae. *Inflorescentia* axillaris, pauciflora, circa 7 mm. longa, densius adpresse ferrugineopubescens, pedicellis brevibus; bracteolae sat crassae, circa 2 mm. diametro, dorso pilis fulvis adpressis densius tectae, ciliatae. *Calyx* 4 mm. longus, lobis inter se subaequalibus rotundatis circa 1·5 mm. longis et 1·75 mm. latis dorso pilis brevibus adpressis fulvis tectis ciliatis. *Vexillum* 5 mm. longum, suborbiculare, apice emarginatum, basi biauriculatum, stipite 1·5 mm. longo suffultum; alae oblongae, basi latere altero hastatae, altero rotundato-auriculatae, 4·75 mm. longae, 2·5 mm. latae, stipite 2 mm. longo suffultae; carinae petala oblonga, basi latere altero hastata, altero truncato-hastata, 5 mm. longa, stipite 2 mm. longo suffulta. *Stamina* monadelpha. *Ovarium* glabrum, stylo 3 mm. longo. *Legumen* falcato-subreniforme, 3 cm. longum, 1·6 cm. latum, stipite 5 mm. longo suffultum, calyce persistente.

Bangkok, Paknam, near sea-level, in tidal mud along with *Derris uliginosa*, *Kerr* 6762.

Bauhinia bracteata *Graham*, var. **Marcanii** *Craib* [Leguminosae-Bauhinieae]; a typa foliis basi alte cordatis subtus pilis divergentibus molliter pubescentibus, bracteis maioribus, pedicellis longioribus, floribus paulo maioribus recedit.

Hua Hin, 60 m., *Marcan* 368.

When more fully represented this plant, very distinct from the type in its foliage, may have to be accorded specific rank.

Bauhinia Helferi *Craib* [Leguminosae - Bauhinieae]; a *B. bracteata* Graham, bracteis maioribus, pedicellis multo longioribus recedit.

Frutex alte volubilis; ramuli iuventute griseo-vel subferrugineo-tomentosi, mox fere glabri, cortice brunneo vel cinereo-brunneo obtecti. *Folia* oblata vel ovato-rotundata, apice ad partem trientem vel fere ad medium bilobata, lobis interdum conspicue divergentibus apice breviter obtuse acuminatis vel rotundatis, basi cordata vel truncato-cordata, usque ad 16 cm. longa et 19 cm. lata, sat rigida, supra viridia, primo sparse pilosa, matura nisi ad imam basem glabra, subtus pallidiora, breviter molliter ad nervos densius pubescentia, costa apice excurrente, nervis basalibus utrinque 4–5 intra marginem anastomosantibus supra conspicuis subtus prominentibus, nervis transversis supra conspicuis vel subconspicuis subtus prominulis, nervulis rete gracile efficientibus, petiolo ad 7 cm. longo basi apiceque incrassato terete suffulta; stipulae fugaces. *Racemi* conspicue bracteati, paniculam ad ramulorum apices efficientes, pedunculo communi brevi suffulti, griseo- vel ferrugineo-griseo-tomentosi; bracteae foliaceae, ellipticae vel ovato-ellipticae, apice brevius acuminatae, utrinque breviter pilosae, plus minusve conspicue nervosae, circa 10 mm. longae et 7 mm. latae; pedicelli 6–8 cm. longi, primo dense griseo-tomentosi, mox sparse pubescentes, fere ad medium vel saepissime supra medium bibracteolati, bracteolis nisi minoribus bracteis similibus. *Calycis* tubus circa 2mm. longus, lobi sub anthesin liberi, lineares, apicem versus angustati, subacuti, ad 14 mm. longi et 3 mm. lati, extra breviter crispatim pubescentes, intra pallidiores, sparse pubescentes, cito reflexi. *Petala* pallide viridia (ex *Kerr*), inter se subaequalia, ungui circa 15 mm. longo suffulta, limbo ovato vel elliptico basi decurrente ad 12 mm. longo 8 mm. lato conspicue nervoso utrinque piloso. *Stamina* fertilia 3, filamentis fere 4 cm. longis parce pilosis, antheris 3mm. longis. *Ovarium* 6 mm. longum, tomentosum, stipite 8 mm. longo pubescente suffultum, stylo 13 mm. longo pubescente sed apicem versus glabrescente, stigmate incrassato.—*B. bracteata*. auct. plur. quoad spec. burm. *non* Graham.

Chiengmai, Mê Chêm, c. 500 m., mixed deciduous forest by stream, *Kerr* 6270.

Distr. Tenasserim, *Helfer* K.D. 1893.

Vern. Paw mung (ex *Kerr*).

Additional collections of material from Siam have confirmed the writer's statement (Contrib. Fl. Siam, p. 75) that " the Tenasserim plant quoted in F.B.I., ii. p. 282 does not belong to this species " (*i.e.* to *B. bracteata* Grah.) and have added the Tenasserim species to the Siamese Flora. The Tenasserim plant quoted by all authors as *B. bracteata* is the plant described above as *B. Helferi*.

One result of regarding the Tenasserim plant as *B. bracteata* has been the re-description of the latter under at least two different names. *B. unguiculata*, described by Baker (F.B.I., ii. p. 277) from Schomburgk's Siam specimen and by an oversight enumerated in *Pileostigma* instead of in *Phanera*, is only a form of the true *B. bracteata* Grah. In Fl. Gen. Indo-Chine, ii. p. 123 both *B. unguiculata* and *B. bracteata* are treated as insufficiently known, with the result that the plant is again described under the name *B. Harmandiana* Pierre ex Gagnep.

Bauhinia Kerrii *Gagnep.* var. **grandiflora** *Craib* [Leguminosae-Bauhinieae] ; a typo foliis maioribus pro longitudine latioribus, alabastris maioribus indumento vix tam denso tectis, floribus conspicue maioribus recedit.

Chieng Kien, near Chiengrai, c. 420 m., evergreen jungle, *Kerr* 2481.

Bauhinia Prainiana *Craib* [Leguminosae-Bauhinieae] ; a *B. polycarpa* Wall., foliis maioribus tenuioribus, stipulis maioribus diutius persistentibus, racemis brevioribus, legumine longiore et latiore, valvis planis haud inter semina depressis recedit.

Frutex ad 1·5 m. altus (ex *Kerr*) ; ramuli graciles, straminei vel brunneo-straminei, plurisulcati, glabri vel subglabri. *Folia* ambitu saepissime orbicularia vel suborbicularia, apice plus minusve ad partem trientem bilobata, lobis breviter obtuse acuminatis, basi distincte cordata vel interdum truncato-cordata, usque ad 17·5 cm. longa et 17 cm. lata, membranacea, supra glabra, subtus pallidiora, pilis brevibus albis adpressis inconspicuis instructa, costa excurrente, nervis basalibus utrinque 4–5 cum costa supra conspicuis vel prominulis subtus prominentibus, nervis transversis sat distantibus subtus prominulis, rete sub oculo armato gracili, petiolo 5–8 cm. longo supra canaliculato subglabro stramineo basi apiceque incrassato suffulta ; stipulae persistentes, setaceae, circa 5 mm. longae, ciliatae. *Racemi* circa 3 cm. longi, et terminales et in axillo supremo, simplices vel ramosi ; bracteae bracteolaeque breves ; pedicelli sicco fusci, 3–4 mm. longi ; alabastra ambitu plus minusve oblonga, breviter acuminata, pilis brevibus adpressis albis instructa. *Calyx* membranaceus, spathaceus, basi saccatus, sub anthesin 8 mm. longus, saepe bilobatus. *Petala* alba (ex *Kerr*), inter se subaequalia, oblongo-lanceolata vel oblongo-obovata, apice breviter obtuse acuminata, ad 15 mm. longa et 5–7 mm. lata, glabra, unicostata, nervis lateralibus conspicue anastomosantibus. *Stamina* inter se inaequialta, ad 8 mm. longa, filamentis inferne sparse pilosis, antheris 2·5 mm. longis. *Legumen* primo breviter adpresse pubescens, stylum brevem et stigma latum gerens, vix maturum 9 cm. longum, 1·4 cm. latum, stipite circa 4 mm. longo suffultum, valvis planis haud inter semina constrictis.—*B. polycarpa* Wall., var. *Kurzii* Prain in Journ. As. Soc. Beng., lxvi. p. 495 (1897).

Mê Mue, Mûang Tāk, c. 300 m., mixed deciduous forest, *Kerr* 6150.

Distr. Burma.

Prain, l.c., while according only varietal rank to Kurz's plant, recorded his conviction that when better known the plant would have to be ranked as a distinct species.

Bauhinia Sanitwongsei *Craib* [Leguminosae-Bauhinieae] ; ob calycem sub anthesin saepissime 2-lobatum subherbaceum, stylum tenuiorem fere glabrum, stipitem breviorem et magis robustam a *B. bracteata* Graham distincta.

Frutex robustus, volubilis ; ramuli glabrescentes, teretes, cortice rubro-brunneo vel subfusco obtecti, lenticellis parvis numerosis conspicuis instructi. *Folia* ambitu oblonga vel rotundato-oblonga, apice ad partem trientem vel fere ad medium bilobata, lobis apice rotundatis, basi altius cordata, usque ad 12·5 cm. longa et 11·5 cm. lata, subcoriacea, supra glabra, subtus pallidiora, cito fere glabra nisi ad nervos ubi pilis paucis divergentibus instructa, 11-13-nervia, nervis supra pallidis conspicuis subtus prominentibus, nervis transversis supra subconspicuis subtus prominulis, arcte reticulata, petiolo apice basique incrassato 3-5 cm. longo subterete suffulta. *Racemi* axillares, circa 10 cm. (pedunculo communi 2-3·5 cm. longo incluso) longi, e ramulis defoliatis orti, rhachi subferrugineo-tomentosa ; bracteae deciduae, angustae, 4-8 mm. longae ; pedicelli 5 cm. longi, breviter crispatim albo-pubescentes, fere ad medium bracteolis duabus ad 2 mm. longis angustis mox deciduis instructi ; alabastra viridia, breviter adpresse pubescentia, plus minusve glabrescentia. *Calyx* sub anthesin in segmenta duo fissus, 7 mm. longus, extra puberulus, intra pallidior, glaber. *Petala* viridi-lutea, duo infima purpureo-nervosa (ex *Kerr*), ungui 13–18 mm. longo suffulta, limbis ad 10 mm. longis et 12 mm. latis, postico aliis paulo maiore et brevius unguiculato, unguibus pubescentibus, limbis plus minusve pilosis. *Stamina* fertilia 3, filamentis 1·8 cm. longis pubescentibus, antheris vix 3 mm. longis. *Ovarium* dense pubescens, 3·5 mm. longum, stipiti subaequilongum, stylo 5 mm. longo apice glabro inferne gradatim magis pubescente, stigmate parvo.

Bangkok, cultivated by Dr. Yai Sanitwongse (ex *Herb. Kerr*).

Bauhinia strychnifolia *Craib* [Leguminosae-Bauhinieae]; a *B. cardinale* Pierre, cui facie persimilis, rhachi pedicellisque pilis plus minusve divergentibus instructis, alabastris haud dense adpresse rufo-pubescentibus inter alia recedit.

Caules e radice lignosa annui, ad 1·5 m. alti, interdum scandentes (ex *Kerr*); ramuli graciliter cirrhiferi, semiherbacei, tetragoni, sulcati, glabri vel interdum parcissime pubescentes, sicco rubro-brunnei vel castanei. *Folia* ovata, oblongo-ovata, vel ovato-lanceolata, apice integra, saepe acuminata vel subacuminata, mucronulata, basi rotundata vel truncata, cordatula, usque ad 12 cm. longa et 8 cm. lata, subcoriacea, pagina utraque glabra, e basi 5-nervia, nervis cum costa supra conspicuis vel prominulis subtus prominentibus, nervis secondariis (e costa ortis) utrinque 2–4 supra conspicuis vel subprominulis subtus prominulis, nervulis rete gracile pagina utraque conspicuum efficientibus, petiolo basi apiceque incrassato 1·5–3·8 cm. longo glabro supra canaliculato suffulta; stipulae deciduae, circa 3 mm. longae. *Racemi* terminales, ad 27 cm. (pedunculo communi ad 5–6 cm. longo excluso) longi, rhachi rubra (ex *Kerr*) sulcata breviter pubescente; bracteae angustae, alabastra iuvenilia longius superantes, sub anthesin persistentes, pubescentes; alabastra nutantia; pedicelli 6–7 mm. longi, breviter pubescentes, apicem versus bracteolis duabus parvis instructi; receptaculum circa 5 mm. altum. *Calycis* coriacei tubus supra receptaculum 4 mm. longus, lobi 5, fere 5 mm. longi; calyx dorso puberulus, intra glaber, lobis ciliatis. *Petala* cum calyce rubra (ex *Kerr*), omnia ungui 2–3 mm. longo suffulta, postico late ovato obtuso basi truncato 10 mm. longo 9 mm. lato medio incrassato extra medio superne subsparse adpresse pubescente intra nisi inferne marginem versus sparse pubescente, lateralia subelliptica, obtusa, basi plus minusve cuneata, parum inaequilateralia, 12·5 mm. longa, 7 mm. lata, extra superne adpresse pubescentia intra sparse pubescentia, antica oblonga, obtusa, basi cuneata, parum inaequilateralia, 12 mm. longa, 5 mm. lata, utrinque sed intra densius pubescentia. *Stamina* fertilia 3, exserta, filamentis glabris 1·7 cm. longis sicco fuscis. *Ovarium* 6 mm. longum, cum stipite 3 mm. longo dense adpresse pubescens, ovulis circa 12, stylo 12 mm. longo adpresse pubescente pilis superne gradatim paucioribus, stigmate stylo subaequilato.

Kampeng Pet, c. 100 m., open deciduous (*Dipterocarpus tuberculatus*) forest, *Kerr* 5958.

Vern. Ka yan (ex *Kerr*).

Bauhinia Winitii *Craib* [Leguminosae-Bauhinieae]; a *B. calycina* Ridl. foliis minoribus ad basem partitis, stylo glabro recedit

Frutex alte scandens ; ramuli cirrhiferi, sat validi, iuventute plus minusve adpresse rufo-pubescentes, sulcati, mox subglabri, castanei. *Folia* ambitu elliptico-oblonga, ad basem 2-partita, segmentis apice rotundatis, basi cordata, circa 4 cm. diametro, membranaceo-coriacea, basem versus pagina inferiore pilis rufis adpressis instructa, aliter glabra, nervis basalibus utrinque 4 subtus subprominentibus, rete gracili vix conspicuo, petiolo circa 1 cm. longo plus minusve rufo-pubescente suffulta. *Racemi* terminales, 15 cm. longi, rhachi 6–7 mm. diametro primo adpresse rufo-pubescente mox sparse pubescente ; bracteae deciduae, circa 5 mm. longae, adpresse rufo-pubescentes ; pedicelli 8 mm. longi, saepe persistentes ; alabastra ambitu ovato-lanceolata, obtusa, circa 3·5 cm. longa, dense breviter adpresse rufo-pubescentia, calycis tubo 6 cm. longo sulcato. *Calyx* sub anthesin bilabiatim fissus, segmentis 3·5 cm. longis 6 mm. latis intra pallidioribus glabris. *Petala* alba (ex *Winit*), ad 8 cm. longa et 4 cm. lata, dorso sparse pilosa. *Stamina* fertilia 10 (?), petalis subaequilonga, antheris circa 2 cm. longis. *Ovarium* glabrum, stipite circa 4 cm. longo suffultum, stylo glabro, stigmate peltato circa 4 mm. diametro. *Legumen* vix maturum, ad 27 cm. longum et 8 cm. latum, tenue, brunneum, stipite fere 6 cm. longo suffultum.

Kanburi, open dry deciduous forest, 30 m., *Winit* 494.

Siamese Name, Kew Nang.

According to Winit the bark is very astringent and is used by the natives for chewing with betel leaves.

Gomphostemma strobilinum *Wall.*, var. **variegatum** *Craib* [Labiatae-Prasieae] ; a var. *acaule* Prain, indumento foliorum et praesertim inflorescentiae tenuiore et sparsiore recedit.

Doi Sutep, evergreen jungle, c. 540–900 m., *Kerr* 835, 835 A. Doi Angkā, Pā Ngêm, 1110 m., *Garrett* 66.

Actephila Collinsae *Hunter* [Euphorbiaceae-Phyllantheae] ; species nova ab *A. ovalis* (Ridl.) Gage, foliis haud longe acuminatis, nervulis inconspicuis, stylis haud ad basem liberis recedit.

Frutex 1–1·5 m. altus (ex *Marcan* et *Winit*) ; ramuli pseudoverticillati, iuventute parce pilosi, angulati, subcastanei, mox glabri, teretes, cinereo-corticati, lenticellis parvis conspicue instructi. *Folia* ad ramulorum apices aggregata, oblanceolata, late oblanceolata vel oblongo-oblanceolata, apice obtusa vel leviter obtuse acuminata, basi cuneata, 7–15 cm. longa, 2·4–5 cm. lata, rigide chartacea vel coriaceo-chartacea, sicco supra viridia vel castanea, nitida, glabra, subtus pallidiora, primo pilis paucis adpressis ad costam instructa, cito glabra, nervis lateralibus utrinque 12–15 intra marginem anastomosantibus pagina utraque magis minusve prominulis, margine integra, reflexa, petiolo 3-6 mm. longo suffulta ; stipulae deciduae, 2 mm. longae, dorso adpresse pubescentes. *Fl.* ♂ pedicellis circa 5 mm. longis suffulti. *Sepala* 5, ovato-lanceolata, ovata, vel oblongo-lanceolata, apice obtusa, 5 mm. longa, 2·5 mm. lata, dorso pilis paucis instructa, integra. *Petala* 5, circa

0·5 mm. longa. *Stamina* 5, omnino libera, in disco inserta, sepalis paulo breviora, antheris parvis globosis. *Discus* integer. *Ovarii* rudimentum evolutum, minutum. *Fl.* ♀ pedicellis circa 3·6 cm. longis glabrescentibus superne paulo et gradatim incrassatis suffulti. *Sepala* 5, paulo post anthesin elliptica, apice rotundata, 6 mm. longa, 5 mm. lata, glabra, cito aucta, prominenter circa 9-costata. *Petala* maris. *Discus* annularis. *Ovarium* breviter hirsutum ; styli 3, integri, liberi, 3 mm. longi ; stylopodium ovario fere dimidio brevius.

Petchaburi, 30–80 m., *Mrs. D. J. Collins* 601, *Marcan* 536, *Winit* 552.

Siamese Name, Si Som (ex *Winit*).

Daphniphyllum longipes *Craib* [Euphorbiaceae-Phyllantheae) ; ab affini *D. calycino* Benth., foliis maioribus longius petiolatis, floribus masculis longius pedicellatis recedit.

Arbor circa 5 m. alta (ex *Kerr*) ; ramuli fistulosi, primo parce pubescentes, pallide corticati, lenticellis parum elevatis conspicue instructi. *Folia* apices versus ramulorum disposita, oblongo-elliptica, apice acuminata vel subacuminata, basi cuneata, 11–29 cm. longa, 4·5–12·8 cm. lata, rigide chartacea, sicco haud fuscescentia, supra viridia, subtus pallide viridia, pagina utraque glabra, inferiore papillosa, nervis lateralibus utrinque 13–15 intra marginem anastomosantibus supra conspicuis saepe parum impressis subtus prominentibus nervulis supra conspicuis vel subconspicuis subtus prominulis, margine recurva, petiolo 3–10 cm. longo supra apicem basemque versus canaliculato medio terete vel subterete glabro vel sparse pubescente suffulta. *Racemi* masculi axillares vel ex axillis foliorum delapsorum orti, basi perulis deciduis instructi, rhachi pedunculo communi brevi vel perbrevi incluso 6 cm. longa glabra, pedicellis sub anthesin divaricatis 2·8 cm. longis. *Sepala* 4, quoad formam variabilia, saepissime ovata, late ovata, vel elliptica, ad 3 mm. longa et 2·5 mm. lata, glabra. *Stamina* 12, circa 3·25 mm. longa, sicco fusca.

Doi Sutep, 900 m., marshy ground in evergreen jungle, *Kerr* 3592.

Trigonostemon Kerrii *Craib* [Euphorbiaceae-Cluytieae] ; ab affini *T. heterantho* Wight, petiolo breviore, paniculis distincte pedunculatis, inter alia recedit.

Frutex 1·5–4-metralis (ex *Kerr*) ; ramuli primo hirsuti, mox plus minusve glabrescentes, cortice substramineo vel brunneo-stramineo obtecti. *Folia* lanceolata vel oblongo-lanceolata, obtuse acuminata, basi cuneata, rarissime subrotundata, ad 17 cm. longa et 4 cm. lata, chartacea vel rigide chartacea, supra primo ad costam nervosque laterales parce strigosa, mox glabra, subtus pilis similibus sed numerosioribus diutiusque persistentibus instructa, basi glandulis duabus vix 1 mm. longis instructa, nervis lateralibus utrinque ad 14 intra marginem anastomosantibus supra conspicuis subtus prominulis, margine minute glanduloso denticulata, petiolo 0·3–3·8 cm. longo strigoso suffulta ; stipulae parvae, cito deciduae. *Paniculae* ♂ axillares, racemiformes, circa 8 cm. (pedunculo communi circa 2·5 cm. longo incluso) longae, pedunculo rhachi bracteisque breviter magis minusve adpresse hirsutis; pedicelli graciles, 6–8 mm. longi, glabri vel subglabri; bracteae 3 mm. longae, intra glabrae. *Sepala* obovata, apice rotundata, plus minusve irregulariter denticulata, 1·5–2 mm. longa, 1·25–1·5 mm. lata, ciliata, dorso adpresse hirsuta. *Petala* obovata vel rotundato-obovata, apice rotundata, basi in stipitem plus minusve distinctum angustata, 3·5 mm. longa, 2·5 mm. lata. *Disci* glandulae liberae. *Androecium* 1·5 mm. altum, columna gracili, antheris 3 apice bilobis, loculis ad marginem connectivi crassi sitis. *Racemi* ♀ axillares, masculis subaequilongi iisque similes sed bracteis persistentibus conspicue longioribus pedicellis 2 cm. longis superne gradatim incrassatis. *Sepala* 4 mm. longa, glanduloso-laciniata, marginibus valde recurvis. *Petala* maris. *Disci* glandulae maiores, basi breviter connatae. *Ovarium* glabrum; styli fere ad basem liberi, apice bifidi. *Capsula* 7 mm. alta; calyx persistens, conspicue auctus, longitudine 1 cm. fere attingens.

Nakawn Tai, c. 200 m., evergreen forest, flowers dull red, *Kerr* 5871A, 5871. Mê Wong, Nakawn Sawawn, c. 100 m., mixed forest, flowers purplish red, *Kerr* 6006.

The inflorescences are borne on the current year's shoot, the staminate in the axils of the lower leaves, the pistillate in those of the upper, so that some of the younger specimens appear as if from a dioecious shrub.

Blachia jatrophifolia *Pax et K. Hoffm.*, var. **siamensis** *Craib* [Euphorbiaceae-Crotoneae]; a typo foliis paulo minoribus apice breviter obtuse acuminatis vel obtusis petiolo dimidio breviore suffultis recedit.

Sriracha, below 10 m., in deserted garden, possibly planted, *Kerr* 4257. Sriracha, *Mrs. D. J. Collins* 771.

Differing (ex descr.) rather markedly in some vegetative details from the Cochinchina *B. jatrophifolia* the Siamese plant appears to agree well in floral details. No specimens of the Cochinchina species are available for comparison here and I have consequently treated the Siamese plant as a variety.

Scleria khasiana *C.B.Cl.*, var. **glaberrima** *Turrill* [Cyperaceae-Sclerieae]; a planta typica caulibus foliisque glaberrimis differt.

Doi Sutep, 900–1000 m., common in open grassy jungle, *Kerr* 3358.

IX.—SCABIOSA RHODOPENSIS.

N. Stoianoff and B. Stefanoff.

Among plants in a sterile condition collected by us in the vicinity of the monastery of Bačkovo, and cultivated in the University Botanic Garden, Sofia, was a species of *Scabiosa* with a singular appearance. In August last, a second visit was paid to this locality and we found the same plant flowering in

abundance. It is evidently a new species for which we propose the name *Scabiosa rhodopensis.*

Scabiosa rhodopensis sp. nov. (Section Asterocephalus Coult. Dips. 33 ; Boiss. Fl. Or. iii. 136).

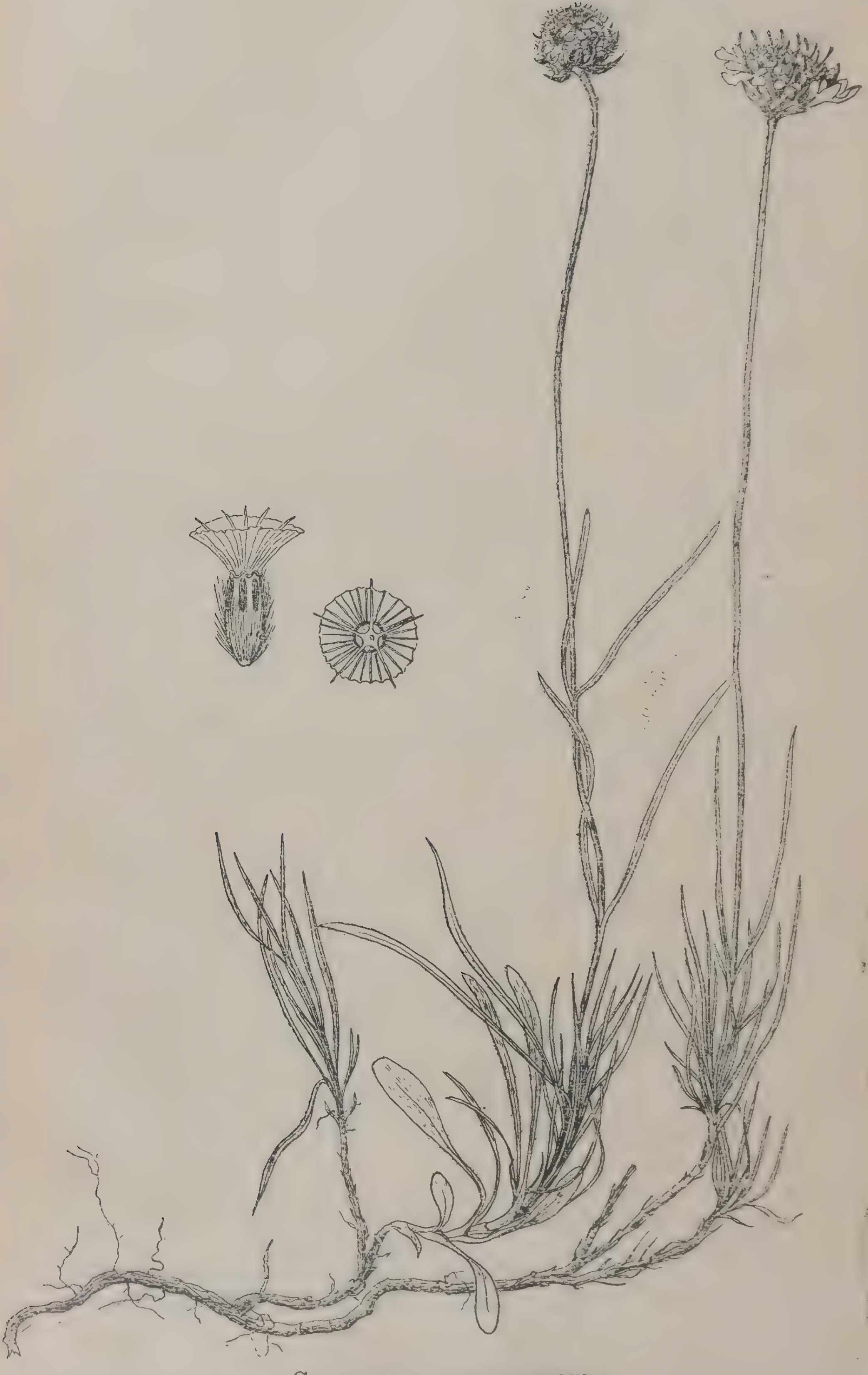
Herba perennis, basi surculoso-caespitosa, ab collo squamoso caulibus adscendentibus, breviter et adpresse pubescens, subunifloris. *Folia* basilaria oblongo-spathulata in petiolum attenuata, apice sub-rotundata ; caulina anguste linearia, basi connata, 6–8 cm. longa, 2-2·5 mm. lata, integra. *Capitula* florentia submajora, 4 cm. diametro, terminalia (rarissime 2-3 aggregata), involucri phyllis inaequalibus capitulo brevioribus elliptico-lanceolatis apice longe attenuatis 6 mm. longis. *Capitula fructifera* globosa 1·6-1·7 cm. diametro. *Flores* albi, extus tomentosi, radiantes. *Involucelli tubus* inferne teres, ecostatus, pilosus, superne in foveolas profundas 8 excavatus. *Corona* 25 radiata, crenulata, tubo paulo brevior. *Calycis* limbus subsessilis, aristis flavido-brunneis corona sub-longioribus instructus.

Bulgaria : in rupibus calcareis monte Rhodope supra coeobium Bačkovo ad Cervena Stena, alt. 1500m. Floret Augusto.

Our plant is easily distinguished from all European species belonging to this group and especially from *Scabiosa graminifolia* L., to which it has some superficial resemblance. It appears to be most closely related to *Scabiosa sulphurea* Boiss. et Huet in Boiss. Fl. Or. iii. 136, a high mountain species growing in the Techdagh, near Erzerum, Eastern Armenia. The latter species, however, is characterized by "foliis radicalibus oblongo-lanceolatis acutis, . . . floribus sulphureis . . . involucelli corona 20-22 radiata, calycis aristis nigris corona multo longioribus."

The limestone cirque, in which *Scabiosa rhodopensis* grows, has very favourable ecological conditions which are suitable to the existence of a large number of species of oriental type. These include Balkan Peninsular endemics, and Asiatic and south-eastern European plants. The following elements are associated in abundance in rocky and dry places with our plant : *Silene Saxifraga* L., *S. Regis Ferdinandi* Deg. et Urum., *Vesicaria gracea* Boiss. et Reut., *Saxifraga Friderici Augusti* Bias., *S. Strybrnyi* Vel., *S. Ferdinandi Coburgi* Kell. et Sünd., *Potentilla geoides* M.B., *Astragalus angustifolius* Lam., *Rhamnus rupestris* Scop., *Viola Grisebachiana* Vis. et Panč., *Daphne oleoides* Schreb., *Linum rhodopeum* Vel., *Carum graecum* Boiss., *Seseli rigidum* W.K., *Sideritis scardica* Griseb., *Scrophularia rupestris* M.B., *Globularia cordifolia* L. var. *meridionalis* Podp., *Valeriana montana* L., *Morina persica* L., *Campanula lanata* Friv., *C. pusilla* Hke., *Trachelium rumelianum* Hampe, *Inula Aschersoniana* Jka., *Senecio macedonicus* Griseb., *Sesleria argentea* Savi, and *S. rigida* Heuff.

The moist and shady places are covered with societies of *Haberlea rhodopensis* Friv., *Arabis procurrens* W.K., ferns and many other rock plants.



Scabiosa rhodopensis.

Finally, the forest formations occurring in the more level places in the cirque are, in the same way, remarkable for the presence of endemics or rare forest types. Thus *Lathraea rhodopea* Dingler and *Cypripedium Calceolus* L. are not very rare in the beech forests. *Epipogon Gmelinii* Rich., *Goodyera repens* R. Br. and *Daphne Laureola* L. are abundant in the formation of *Abies alba*. *Goodyera repens* R. Br. and *Cypripedium Calceolus* L. grow in no other locality in Bulgaria outside this cirque.

A type specimen of *Scabiosa rhodopensis* has been presented to the Kew Herbarium.

X.—THE MEXICAN AND CENTRAL AMERICAN SPECIES OF OURATEA.

L. A. M. Riley.

During the preparation of the "Materials for a Flora of British Honduras" by Mr. T. A. Sprague and myself[*] the necessity for this Revision became apparent. The flora of British Honduras possesses elements in common with so many other parts of tropical America—Mexico, Guatemala, Honduras, Cuba, Jamaica, and even with countries so far distant as the Guianas and Brazil—that it cannot be investigated satisfactorily without extensive collateral research into the floras of those regions. The results are being embodied in a series of papers of which this is the second, the first being "A Revision of the genus *Belotia*" by Mr. Sprague[†] in which the number of known species was more than doubled. In the present Revision the number of Mexican and Central American species of *Ouratea* is raised from nine to fifteen. These figures serve to indicate the incomplete state of our knowledge of the Central American forest flora.

The genus *Ouratea* (*Ochnaceae*) was originally described in 1775 by Aublet[‡] but, owing to the undeserved neglect of Aublet's work by his contemporaries, it was known for many years under the later generic name *Gomphia* Schreb. (1789)[§]. The first species recorded from Mexico was *Gomphia mexicana* Humb. et Bonpl.[||], which was discovered in 1803 by those authors between Acapulco and Chilpancingo in the State of Guerrero. Planchon, to whom we owe the first synopsis of the genus, added a second Mexican species, *G. Jurgensenii*, collected by Jurgensen in Oaxaca at "Sierra San Pedro Nolasco, Talea, etc.", in 1843-4[¶]. The same author described *G. Theophrasta*[**], which was discovered by Linden in 1840 in shady gorges in the neighbourhood of Teapa in the State of Tabasco, and was later introduced into cultivation by Ghiesbreght. Unaccount ably, this original locality has been overlooked by later writers, who have cast doubt upon the native country of this species, and erroneously identified it with the closely-allied Brazilian *O. gigantophylla.*

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[*] Kew Bull. 1924, 1-20, et seq. [†] Kew Bull. 1921, 270-278. [‡] Aubl. Hist. Pl. Guiane Franç. i. 397, t. 152 (1775). [§] Schreb. Gen. i. 291 (1789). [||] Humb. et Bonpl. Pl. Aequinoct. ii. 21, t. 74 (1809); H.B.K. Nov. Gen. vi. 13 (1823). [¶] Hook. Lond. Journ. Bot. vi. 11 (1847). [**] Linden. Cat. 1859, no. 14, 8.

Engler[*] in 1876 revised the whole of the American species known at that date, restoring the original name *Ouratea* and describing *O. globosa* (Mexico) and *O. guatemalensis* (Guatemala). In 1879 Hemsley[†] enumerated four species from Mexico and Central America and a possible fifth. His *Gomphia magdalenae* is *Ouratea nitida*, and his *G. nitida* includes two species *O. Wrightii* and *O. insulae* ; *Gomphia* sp. no. 5 is *O. isthmica*. Two new Guatemalan species *O. podogyna* and *O. Tuerckheimii*, closely allied to *O. Theophrasta*, were added by Donnell Smith in 1893 and 1902 respectively[‡].

Van Tieghem in 1902[§] dealt at considerable length with *Ouratea*, which he divided into thirty-four genera, of which twenty-two are American. The value of Van Tieghem's genera of *Ochnaceae* may be gauged from the fact, pointed out by Gilg[||], that he placed material of the same species, *Ochna mossambicensis* Klotzsch, in three different genera, *Discladium*, *Diporidium* and *Polythecium*. His genera *Ouratella*, *Notouratea*, *Stenouratea* and *Trichouratea* are here treated as synonyms of *Ouratea*. Van Tieghem briefly described two new Central American species, *Stenouratea Wrightii* from Nicaragua, and *Ouratea panamica* collected by Duchassaing in Panama in 1851, which latter is conspecfic with *O. nitida*. He also described as new a Mexican species, *Notouratea recurva*, from a specimen collected in Oaxaca by Galeotti in 1839 ; this is conspecific with *O. Jurgensenii.*

Urban[¶] has published various critical notes on, and descriptions of, West Indian species of *Ouratea*. In 1899 he based a proposed new species, *O. cubensis*, on specimens collected in Cuba by Wright and Combs. This proves to be conspecific with *O. nitida*, which is now known also from British Honduras and Panama, in addition to Jamaica, where it was originally discovered. Standley, in his Trees and Shrubs of Mexico[**], records two species only as occurring in Mexico and, unfortunately, has wrongly identified both of them. His *O. pallida* is *O. mexicana* Humb. et Bonpl., and his *O. mexicana* is impossible to identify from the very brief description, and also on account of his omission to cite collectors' numbers. Six species are now recognised from Mexico, two of which are described for the first time.

My thanks are due to the Director, Royal Botanic Gardens, Kew, for the opportunity to study the material in the Kew herbarium and to Professor H. Lecomte of the Muséum

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[*] Mart. Fl. Bras. xii. pars 2, 323. 345 (1876.) [†] Biol. Centr.-Amer., Bot. i. 176 (1879) ; et op. cit. iv. 111 (1887). [‡] Coult. Bot. Gaz. xviii. 2 (1893) ; et op. cit. xxxiii. 249, t. 10 (1902). [§] Ann. Sc. Nat. sér 8. xvi. 204–343 (1902). [||] Urb. et Graebn. Festschr. Aschers. 105 (1904). [¶] Urb. Symb. Antill. i. 362–365 (1899) ; et op cit. v. 425–430 (1908) ; viii. 434 (1920). [**] Contrib. U.S. Nat. Herb. xxiii. 819 (1923).

d'Histoire Naturelle, Paris, for his courtesy in enabling me to examine material of three species of *Ouratea*, and to Dr. A. B. Rendle, Keeper of the Department of Botany, British Museum, for facilities for studying certain historic specimens.

CLAVIS SPECIERUM.

- Folia 30–45 cm. longa, apice ramorum aggregata :
  - Folia oblanceolato - oblonga, nervis tertiariis subtus manifestis :
    - Panicula folio brevior vel id subaequans ; pedicelli alabastra ovoidea aequantes vel iis breviores .... 15. *Theophrasta.*
    - Panicula folia subaequans ; pedicelli alabastris oblongo - ovoideis longiores .... 14. *Tuerckheimii.*
  - Folia oblonga, nervis tertiariis subtus haud manifestis ; panicula dimidium folii aequans ; pedicelli alabastris lanceolato-ovoideis longiores .... 13. *podogyna.*
- Folia 4–17 cm. longa secundum ramos disposita :
  - Paniculae ramulos abbreviatos aphyllos vel paucifoliatos terminantes ; rami sicut ramuli non-abbreviati gemma terminati ; folia 4–9 cm. longa...... 1. *mexicana.*
  - Paniculae ramulos foliatos non-abbreviatos terminantes ; folia 8·5–17 cm. longa :
    - Nervi et venulae utrinque insculpti :
      - Folia membranacea, basi acuta ; paniculae folia vix aequantes ; pedicelli alabastris 3–plo longiores .... 3. *globosa.*
      - Folia coriacea, basi obtusa vel rotundata ; paniculae folia superantes ; pedicelli alabastris 1½–2-plo longiores............ 2. *nitida.*
    - Nervi et venulae haud insculpti :
      - Pedicelli 1 cm. longi vel ultra :
        - Folia serrulata, interdum inconspicue ; pedicelli 1–1·5 cm. longi ; antherae obclavatae.. 5. *Jurgensenii.*
        - Folia argute serrata ; pedicelli haud ultra 1 cm. longi ; antherae subfusiformes...... 6. *pyramidalis.*
      - Pedicelli haud 1 cm. longi :
        - Folia obtuse et indistincte denticulata :
          - Folia haud vel brevissime acuminata.................. 8. *oblita.*

- Folia valde acuminata :
  - Nervi laterales numerosi, patentes, paralleli, petiolis circiter 3 mm. longis ; inflorescentia laxa, pauciramosa pedicellis robustis ; alabastra 8–8·5 cm. longa ; sepala extra rugosa ..... 9. *isthmica.*
  - Nervi laterales pauciores, ascendentes, satis irregulares, petiolis 6–9 mm. longis ; inflorescentia densa, multiramosa, pedicellis gracilibus ; alabastra 5·5–6 mm. longa ; sepala extra sublaevia. .... 4. *insulae.*
- Folia acute et distincte serrata :
  - Panicula late pyramidalis, satis ramosa ; antherae subfusiformes .... 6. *pyramidalis.*
  - Panicula oblonga, pauciramosa ; antherae obclavatae :
    - Alabastra anguste ovoidea, peracuta vel breviter acuminata ; folia oblanceolato - oblonga, basi obtusa vel cuneata ..... 11. *stenobotrys.*
    - Alabastra late ovoidea, obtusa vel acuta :
      - Folia basi obtusa vel cuneata :
        - Panicula densa, 5–6 cm. longa ; folia caudato-acuminata, fere ad basin serrata, stipulis 7–8 mm. longis. .... 12. *Wrightii.*
        - Panicula laxa, 4–9 cm. longa ; folia breviter acuminata, inferne integra, stipulis 5 mm. longis ...... 7. *guatemalensis.*
      - Folia basi rotundata, vix vel breviter acuminata tantum ; panicula 8 cm. longa. ....10. *Peckii.*

1. **O. mexicana** (*Humb. et Bonpl.*) *Engl.* in Mart. Fl. Bras. xii. pars 2 312 (1876).—*Gomphia mexicana* Humb. et Bonpl. Pl.

Aequinoct. ii. 21, t. 74 (1809); DC. Monogr. Ochnac. et Simaroub. 23 (Ann. Mus. Par. xvii. 420; 1811); H.B.K. Nov. Gen. et Sp. vi. 13 (1823); Hemsl. Biol. i. 176 (1879). *Ouratella mexicana* Van. Tiegh. in Ann. Sc. Nat. sér. 8, xvi. 289 (1902). *Ouratea pallida* Standley in Contrib. U.S. Nat. Herb. xxiii. 820 (1923).

Mexico. Guerrero: Between Acapulco and Chilpancingo, *Humboldt and Bonpland*; Acapulco and vicinity, *Palmer* 412. Sinaloa: Escuinapa; Cerrito de Fuerte, 30 m., *Gonzalez* 1134.

Vernacular name " Palo chino " (Gonzalez).

I have compared Palmer's specimen with Humboldt and Bonpland's figure. Their plant, as represented, has somewhat broader leaves with coarser serration. In other respects, Palmer's specimen well agrees, except that, on dissection, I find the petals slightly emarginate. Comparison of Standley's description of *O. pallida* with the original description of *O. mexicana*, amplified in Nov. Gen. et Sp. l.c., reveals so many points of similarity that I have no hesitation in citing *O. pallida* simply as a synonym. As to Standley's *O. mexicana*, beyond the fact that it certainly is not *O. mexicana* of Humboldt and Bonpland it is impossible to go. It may possibly be *O. guatemalensis* Engler, or even a new species.

Van Tieghem (l.c.) separated his genus *Ouratella* mainly on the lateral character of the inflorescence, the leaves being deciduous and the flowers appearing before, or at the same time as, the new leaves. While these characters are hardly of generic value, they seem to justify the recognition of a distinct section of *Ouratea* comprising *O. mexicana* and *O. Guildingii* (Planch.) Urb.

2. **O. nitida** (*Swartz*) *Engl.* in Mart. Fl. Bras. xii. pars 2, 310 (1876), quoad stirp. jamaic. tantum; Maza, Periant. 46 (1894).—*Ochna nitida* Swartz, Prodr. 67 (1788). *Gomphia nitida* Vahl, Symb. ii. 49 (1791); Swartz, Fl. Ind. Occ. ii. 739 (1800); Planch. in Hook. Lond. Journ. Bot. vi. 12 (1847); Griseb. Cat. Pl. Cub. 36 (1866); Sauv. Fl. Cub. 20, n. 339 (1873). *Trichouratea nitida* Van Tiegh. in Ann. Sc. Nat. sér. 8, xvi. 235 (1902), quoad syn. *Ouratea cubensis* Urb. Symb. Antill. i. 362 (1899); Van Tiegh. l.c. 252 (1902). *O. panamica* Van Tiegh. l.c. 263. *Gomphia acuminata* A. Rich. in La Sagra Hist. Cuba. x. 139 (1845): Ess. Fl. Cub. 338; Combs in Trans. Acad. Sc. St. Louis. vii. 407 (1897); non. DC. *G. Magdalenae* Hemsl. Biol. i. 176 (1879), non Triana et Planch.

British Honduras. Belize, *March* 1913; *Campbell* 16; *Peck* 22. Panama. *Duchassaing*. Cuba. *Wright* 2115. Santa Clara: Cienaguita; in savannahs and woods, gravelly poor soil, infrequent. *Combs* 171. Pinar del Rio: Laguna Jovero and vicinity. *Shafer* 10845. Vuelta de Abajo (ex A. Rich. ll. cc.). Jamaica. *Roger Shakespear* (Mus. Brit.).

Vernacular name " Guanabanilla de Monte " (Cuba).

O. nitida was originally discovered in woods in the interior of Jamaica by Swartz. I have not seen his type, but have examined a specimen in the British Museum collected in Jamaica by Roger

Shakespear which is named *Gomphia nitida* in Swartz's handwriting, and agrees with his description. I can find no characters by which to separate specifically the Cuban material which Urban has distinguished as *O. cubensis.*

Judging from Van Tieghem's description, the actual specimens which he associated with the new combination *Trichouratea nitida* are not conspecific with *O. nitida* (Swartz). The simultaneous development of leaves and flowers suggests *O. Guildingii* Urb.

3. **O. globosa** *Engl.* in Mart. Fl. Bras. xii. pars 2, 323 (1876); Van Tiegh. in Ann. Sc. Nat. sér. 8, xvi. 291 (1902).

MEXICO. Lizando, *Wawra* 273.

I have seen no material of this species.

4. **Ouratea insulae** *Riley*, sp. nov.

Ramuli robusti, 2–3 mm. diametro infra folium supremum, cinerascentes. *Folia* oblonga, 10–13 cm. longa, 3·5–3·8 cm. lata, valde acuminata, basi cuneata vel obtusa, superne et medio remote et inconspicue dentata, inferne integra, concoloria, supra nitidula, costa tantum conspicua, subtus opaca, nervis ascendentibus venisque patentibus satis manifestis; petioli 6–9 mm. longi; stipulae triangulato-lanceolatae, circiter 3 mm. longae. *Panicula* late pyramidalis, divaricato-ramosa, 8–16 cm. longa, ramulis patulis densifloris 4–10·5 cm. longis; pedicelli bini vel terni, brevissime pedunculati, graciles, 6–9 mm. longi; bracteae subulatae, ferrugineae, circiter 2 mm. longae. *Albastra* (in sicco) ovoidea, 5·5–6 mm. longa, 3 mm. lata, obtuse et breviter acuminata. *Sepala exteriora* oblongo-lanceolata, 6·25 mm. longa, 2 mm. lata, apiculata, basi rotundata, brunnea, marginibus pallidioribus, extra laevia; sepala interiora oblongo-ovata, breviter apiculata, 6·25 mm. longa, fere 3 mm. lata marginibus hyalinis 0·75 mm. latis inclusis. *Petala* in toto 7·5 mm. longa, 6·5 mm. lata, ungue 3 mm. longo medio 1·5 mm. lato; lamina transverse elliptica, apice rotundata vel subtruncata. *Antherae* 9, sessiles, 5·5 mm. longae, transverse rugulosae, in apicem obtusum gradatim angustatae pallescentesque. *Ovaria* 5, ellipsoidea, fere 1 mm. longa, 0·5 mm. diametro, gynophoro 0·5 mm. longo insidentia; stylus 5·5 mm. longus, arcuatus tantum. *Fructum* non vidi.—*Gomphia nitida* Hemsl. Biol. iv. 111, non Swartz.

HONDURAS. Ruatan Island, *Gaumer* 89 (type in Herb. Kew).

5. **O. Jurgensenii** (*Planch.*) *Engl.* in Mart. Fl. Bras. xii. pars 2, 352 (1876).—*Gomphia Jurgensensii* Planch. in Hook. Lond. Journ. Bot. vi. 11 (1847); Hemsl. Biol. i. 176 (1879); Van Tiegh. in Ann. Sc. Nat. sér. 8, xvi. 290 (1902). *Notouratea recurva* Van Tiegh. l.c. 220. descr. ampl.

Floris descriptio, quae adhuc deest, ex alabastro semiaperto confecta sequitur. *Sepala exteriora* ovato-lanceolata, 8 mm. longa, 2·75 mm. lata, obtusa, basi subtruncata; sepala interiora oblongo-ovata, 8 mm. longa, 3 mm. lata marginibus hyalinis 1 mm. latis inclusis, obtusissima, basi vix truncata. *Petala* obovata, 8·5 mm. longa, 4·25 mm. lata, rotundata, basi

1 mm. lata, costa valde incrassata nigrescente. *Antherae* 9, sessiles, obclavatae, 6–6·5 mm. longae, transverse rugulosae. *Ovaria* 5, ellipsoidea, 0·75 mm. longa, 0·5 mm. diametro, gynophoro 0·75 mm. longo insidentia; stylus 5 mm. longus, flexuosus. *Carpophorum* campanulato-turbinatum, recurvum, unam vel rarius duas drupas gerens. *Drupa* (ex Van Tiegh. l. c. 220) ovoidea nigra, 8–10 mm. longa, 7–8 mm. diametro.

MEXICO. Oaxaca: Sierra San Pedro Nolasco, Talea etc., *Jurgensen* 779; Chinantla, 900 m., fr. June, *Galeotti* 7243.

The labels accompanying Jurgensen's specimens uniformly give the locality as "Sierra San Pedro Nolasco, Talea, etc.," without specifying the State. There is a town called Talea 36 miles north-east of the city of Oaxaca which I assume to be the one visited by Jurgensen. I have been unable to trace any other town of the same name. Planchon remarks that this species may easily be recognized by the narrow long-acuminate leaves and the fine reticulation. In addition to these characters, the long slender pedicels (up to 1·5 cm.) distinguish it from all other Mexican and Central American species.

6. **Ouratea pyramidalis** *Riley*, sp. nov.

Ramuli graciles, subflexuosi, 1·5 mm. diametro infra folium supremum, fusco-cinerascentes. *Folia* oblongo-elliptica, 11·5–15·5 cm. longa, 4–5 cm. lata, acuminata vel caudato-acuminata, basi cuneata, ab apice usque infra medium argute serrata, illinc fere ad basin remotius et minus conspicue dentata, membranacea, concoloria, utrinque opaca, supra costa et nervis satis manifestis, subtus costa et nervis ascendentibus et venis venulisque omnivagis conspicuis; petioli 4 mm. longi; stipulae subulatae, 1·25 mm. longae. *Panicula* laxe et patule pyramidalis, 6·5–7 cm. longa, 6·5–7 cm. lata, rhachi gracili subflexuosa angulosa; rhachillae circiter 1·5 cm. longae; pedunculi 2·5–4 mm. longi, 1–3-flori; pedicelli 0·7–1 cm. longi; bracteae mox caducae, circiter 1·25 mm. longae. *Alabastra* (in sicco) oblongo-ovoidea, 6 mm. longa, 2·75 mm. lata, obtusissima. *Sepala exteriora* oblongo-ovata, 7 mm. longa, 3 mm. lata, apice obtusa, basi rotundata vel subtruncata, marginibus vix pallidioribus, extra apice subrugulosa; *sepala interiora* oblonga, 6·75 mm. longa, vix 3 mm. lata marginibus hyalinis 1 mm. latis inclusis, obtusa, basi truncata. *Petala* late spathulata, 9 mm. longa ungue 3·5 mm. longo 1·5 mm. lato incluso, 6 mm. lata, apice rotundata. *Antherae* 10, sessiles, elongatae, subfusiformes, 6·5 mm. longae, maxima ex parte ferrugineae, rugulosae. *Ovaria* 5, ellipsoidea, vix 1 mm. longa, 0·5 mm. diametro, gynophoro 1·5 mm. longo insidentia; stylus 4·5 mm. longus, rectus, apice subarcuato. *Fructum* non vidi.

MEXICO. Tabasco: near the village of Atasta, fl. June, *Rovirosa* 495 (type in Herb. Kew). GUATEMALA. Ocós, fl. Jan., *Bernoulli and Cario* 3046 (Herb. Kew).

This species may be easily distinguished from the preceding by the argutely serrate leaves, the stouter pedicels not exceeding 1 cm., and the well-defined claw of the petal.

7. **O. guatemalensis** *Engl.* in Mart. Fl. Bras. xii. pars 2. 345 (1876); S. Wats. in Proc. Am. Acad. xxi. 462 (1886). *Gomphia guatemalensis* Brigham, Guatemala, 426 (1887).

GUATEMALA. *Friedrichsthal* 780; Retaluleu, fl. Dec., *Bernoulli and Cario* 3043; Yzabal: a small shrub in forests at the Chocon plantation, fr. March, *S. Watson* 39 (Herb. Kew).

I have not seen the type (*Friedrichsthal* 780). The other specimens cited agree fairly well with Engler's description.

8. **Ouratea oblita** *Riley*, sp. nov.

Ramuli satis robusti, 1·5 mm. diametro infra folium supremum, fulvo-cinerascentes. *Folia* oblongo-elliptica, 8·5–10 cm. longa, 3–4 cm. lata, obtusa vel breviter acuminata, basi obtuse cuneata, superne remote et inconspicue denticulata, inferne integra, coriacea, supra nitidula, costa applanata nervis ascendentibus et venis patentibus conspicuis, subtus opaca; petioli vix 2 mm. longi; stipulas non vidi. *Inflorescentia* pauciramosa (revera pyramidalis?); rami primarii patuli vel patentes, 6·5–7 cm. longi, laxi, pauciflori; pedunculi 1–4·5 mm. longi, plerumque breves et multiflori, infimi tantum longiores et 2-flori; pedicelli 4–5 mm. longi; bracteae vix 1 mm. longae. *Alabastra* (in sicco) ovoidea, 6·5 mm. longa, 4·5 mm. diametro, obtusissima. *Sepala exteriora* oblongo-lanceolata, vix 8 mm. longa, 2·5 mm. lata, apice obtusa, basi subrotundata; sepala interiora ovata, 7·5 mm. longa, 3·5 mm. lata marginibus pallidioribus inclusis, obtusa, basi rotundata. *Petala* 8 mm. longa ungue 2 mm. longo medio fere 2 mm. lato incluso, 8 mm. lata, lamina transverse elliptica apice subrotundata. *Antherae* sessiles, obclavatae, 5.5 mm. longae, transverse rugosae. *Ovaria* 5, ellipsoidea, 0·75 mm. longa, 0·5 mm. diametro gynophoro vix 0·75 mm. longo insidentia; stylus 5·5 mm. longus, subflexuosus, subacutus. *Fructum* non vidi.

MEXICO: Herb. Sessé et Mociño (type in Mus. Brit.).

The specimen is labelled *Ochna Jabotapita* N[ueva] E[spaña] probably in Ruiz' handwriting.

9. **Ouratea isthmica** *Riley*, sp. nov.

Frutex 3–4·5 m. altus. *Ramuli* graciles, 1·25 mm. diametro infra folium supremum, fulvo-cinerascentes, longitudinaliter striati, glabri vel apice minute pubescentes. *Folia* oblongo-elliptica, 10–10·5 cm. longa, 3–4 cm. lata, acuminata, basi cuneata vel obtusa, fere ad basin obtuse et inconspicue denticulata, tenuiter coriacea, discoloria, supra nitidula, subtus opaca et pallidiora, nervis et venis crebris patentibus parallelis, supra satis manifestis, subtus indistinctis costa tantum conspicua; petioli 2·5–3 mm. longi; stipulae delapsae. *Panicula* laxa, oblonga, 10–12·5 cm. longa, ramo laterali solemni e basi nonnunquam oriente; pedunculi 1–3-flori, 2–5 mm. longi; pedicelli crassi, 6–8 mm. longi. *Alabastra* (in sicco) ovoidea, 8–8·5 mm. longa, 4·5–5 mm. lata, obtusa vel subapiculata. *Floris* characteres ex alabastro maturo descripti. *Sepala exteriora* ovato-lanceolata, 9·5 mm. longa, 4 mm. lata, basi rotundata, ad apicem obtusum gradatim angustata, nigra marginibus pallidioribus, extra rugosa; sepala interiora ovato-oblonga, apiculata, 9·5 mm. longa, 4·25 mm. lata marginibus hyalinis 1·5 mm. latis inclusis. *Petala* sepalis vix longiora. *Antherae* 9, sessiles, obclavatae, curvatae, 6 mm. longae, transverse rugosae. *Ovaria* 5, 0·75 mm. diametro, fere globosa, gynophorum aequantia; stylus obtusus, 6 mm. longus, infra medium tortus. *Fructum* non vidi.—*Gomphia* sp. Hemsl. Biol. i. 176 (1879).

PANAMA. Lion Hill Station, fl. Jan., *Sutton Hayes* 540 (type in Herb. Kew).

Distinguished by the very numerous fine parallel patent nerves of the leaves which suggest those of a *Calophyllum*.

10. **Ouratea Peckii** *Riley*, sp. nov.

Ramuli graciles, 1·5 mm. diametro infra folium supremum, fusco-cinerascentes. *Folia* oblonga vel lanceolato-oblonga, 10–13 cm. longa, 3·5–5 cm. lata, acuminata, basi rotundata vel subtruncata, superne argute et laxe serrata, subcoriacea, concoloria, supra nitidula, subtus subopaca, costa et nervis ascendentibus venisque patentibus utrinque manifestis; petioli incrassati, 2·5–3 mm. longi; stipulae triangulato-acuminatae, 6 mm. longae, basi 2·25 mm. latae, longitudinaliter striatae marginibus pallidioribus. *Panicula* semel ramosa tantum, oblonga, laxa pauciflora, 7 cm. longa; pedunculi inferiores 2–2·5 mm. longi, 1–2-flori, superiores vix evoluti; pedicelli robusti, 7–8 mm. longi; bracteae triangulatae, subacutae, 2 mm. longae. *Alabastra* (in sicco) late ovoidea, 6 mm. longa, 4·5 mm. lata, obtusa. *Sepala exteriora* ovato-oblonga, 7·5 mm. longa, 4 mm. lata, obtusissima, in basin truncatam rotundata, extra subrugulosa; sepala interiora ovato-oblonga, 7·5 mm. longa, 4 mm. lata marginibus hyalinis 1·5 mm. latis inclusis, obtusa, in basin truncatam rotundata. *Petala* obovata, 8·5 mm. longa, 6 mm. lata, apice rotundata, basi 0·75 mm. lata. *Antherae* 10, sessiles, obclavatae, 5·5 mm. longae, transverse rugosae, apice pallidiores. *Ovaria* 5, ellipsoidea, 1 mm. longa, 0·75 mm. diametro, subrugulosa, gynophoro vix 0·75 mm. longo insidentia; stylus 5 mm. longus, rubidus, in medio tortus. *Fructum* non vidi.

BRITISH HONDURAS. *Peck* 617 (type in Herb. Kew).

11. **Ouratea stenobotrys** *Riley*, sp. nov.

Ramuli 1·75 mm. vel fere 2 mm. diametro infra folium supremum, grisei. *Folia* oblongo-elliptica vel oblongo-oblanceolata, 10–18 cm. longa, 3·5–5·5 cm. lata, valde acuminata, basi obtusa vel cuneata, superne circiter ad medium argute serrata, subcoriacea, supra subnitidula, costa et nervis ascendentibus manifestis, venis crebris patentibus parallelis haud conspicuis, subtus opaca, paullo pallidiora, costa applanata, nervis satis manifestis; petioli 4–5 mm. longi; stipulae triangulato-acuminatae, 8 mm. longae, basi circiter 2 mm. latae. *Panicula* semel ramosa tantum, oblonga, satis densa, 12·5–15 cm. longa, circiter 2 cm. lata; pedunculi 2·5–3 mm. longi, in parte inferiori paniculae 1–2 flori, in parte superiori vix evoluti; pedicelli graciles, 5–9 mm. longi; bracteae conspicuae, lanceolato-acuminatae, 3·5–6 mm. longae, longitudinaliter striatae. *Alabastra* (in sicco) anguste ovoidea, 6·5–7 mm. longa, 3·25–4 mm. lata, acuta vel acute acuminata. *Sepala exteriora* ovato-lanceolata, 8·5 mm. longa, 3 mm. lata, minute apiculata, basi rotundata, extra subrugulosa marginibus haud pallidioribus; *sepala interiora* oblonga, 8·5 mm. longa, 3·25 mm. lata marginibus hyalinis 1 mm. latis inclusis, conspicue apiculata. *Petala* obovata, 9 mm. longa, 6 mm. lata, apice rotundata, basi truncata 1·25 mm. lata. *Antherae* 10, sessiles, obclavatae, 6 mm. longae, transverse rugosae, apice pallidiores. *Ovaria* 5, oblonga, 1 mm. longa, vix 0·75 mm. diametro, gynophoro 0·75 mm. longo insidentia; stylus 5 mm. longus, subflexuosus, apice uncinatus. *Fructum* non vidi.

BRITISH HONDURAS. *Hooper* (type in Herb. Kew).

Remarkable for the long narrow panicle and the slender acuminate buds.

12. **Ouratea Wrightii** (*Van Tiegh.*) *Riley*, comb. nov., descr. ampl.

Frutex (Seemann). *Ramuli* robusti, subflexuosi, 1·75 mm. diametro infra folium supremum, fusco-cinerascentes. *Folia* oblongo-oblanceolata vel anguste oblanceolata, 12·5–17 cm. longa, 3–5·5 cm. lata, caudato-acuminata, basi obtusa vel cuneata, superne spinuloso-serrata, inferne fere ad basin argute serrata, coriacea, supra olivacea, opaca, subtus paullo pallidiora, costa excentrica nervisque ascendentibus et venis patentibus utrinque conspicuis; petioli incrassati, 3–4 mm. longi; stipulae longe triangulato-acuminatae, 8–9 mm. longae e basi 2 mm. lata, minute et remote denticulatae, longitudinaliter striatae. *Panicula* semel ramosa tantum, oblonga, densa, 5·5 cm. longa, circiter 2·5 cm. lata; pedunculi 1–3-flori, 1–1·5 mm. longi; pedicelli 5–6 mm. longi, incrassati, conspicue rugosi; bracteae lanceolatae, 1·75 mm. longae, extra rugulosae. *Alabastra* (in sicco) late ovoidea, 6 mm. longa, 4 mm. lata, obtusa. *Floris* characteres ex alabastro maturo descripsi. *Sepala exteriora* ovato-lanceolata, 7 mm. longa, 3·25 mm. lata, apice obtusa, basi rotundata, marginibus anguste pallidioribus, extra rugulosa vel apice subpapillata, ferruginea, nervis satis manifestis; sepala interiora ovato-lanceolata, 7 mm. longa, 3 mm. lata marginibus hyalinis vix 1 mm. latis inclusis, minute apiculata, basi rotundata. *Petala* obovata, 6 mm. longa, 3·75 mm. lata, apice rotundata vel obtusa, in basin truncatam quasi in unguem angustata. *Antherae* 10, obclavatae, 5 mm. longae, transverse rugosae, apice pallidiores. *Ovaria* 5, ellipsoidea, 1·25 mm. longa, 0·75 mm. diametro, gynophoro 1 mm. longo insidentia; stylus 3·5 mm. longus, rectus, rubidus, apice pallidior. *Drupae* 2, ellipsoideae, 8·5 mm. longae, 7 mm. diametro, longitudinaliter rugulosae, carpophoro obconico circiter 5 mm. longo et 5 mm. diametro insidentes.—*Stenouratea Wrightii* Van Tiegh. in Ann. Sc. Nat. sér. 8, xvi. 219 (1902). *Gomphia nitida* Seem. Bot.

Herald. 97; Triana et Planch, in Ann. Sc. Nat. sér. 4, xviii. 274; Hemsl. Biol. i. 176; non Swartz.

NICARAGUA. *Wright.* PANAMA. Chagres, fl. et fr. Feb., *Fendler* 303; in dark forests near Cruces, *Seemann* 547 (Herb. Kew; Mus. Brit.).

In Seemann's specimen (Herb. Kew) the leaves are proportionally narrower, and more acutely cuneate at the base than in Fendler's, and the internodes are shorter, thus giving a denser appearance to the foliage. The specimen under the same number at the British Museum is intermediate in character.

13. **O. podogyna** *Donn. Smith* in Coult. Bot. Gaz. xviii. 2 (1893); Enum. Pl. Guat. iii. 18 (1893).

GUATEMALA. Alta Verapaz: Pansamalá forest, 1140 m., *Tuerckheim* 1034.

"A tree 15–18 ft. high, with leaves resembling in form and size those of *O. gigantophylla* Engl., but with flowers more nearly those of *O. olivaeformis* Engler." (Donnell Smith l.c. 2). I have seen no material of this species.

14. **O. Tuerckheimii** *Donn. Smith* in Coult. Bot. Gaz. xxxiii. 249, t. 10 (1902); Enum. Pl. Guat. vi. 6 (1903).

GUATEMALA. Alta Verapaz: Cubilquitz, 350 m., *Tuerckheim* 7829.

15. **O. Theophrasta** (*Planch.*) *Baillon*, Hist. Pl. iv. 359 (1873). *Gomphia Theophrasta* Planch. in Lind. Cat. 1859, no. 14, 8; et in Hort. Lind. 13 (1859); Hook. f. Bot. Mag. t. 5642. *Wolkensteinia Theophrasta* Regel in Gartenflora xiv. 131, t. 471 (1865); Van Tieghem in Ann. Sc. Nat. sér. 8, xvi. 244 (1902). *Ouratea gigantophylla* Engl. in Mart. Fl. Bras. xii., pars 2, 338 (1876) partim, non Erhard.

MEXICO. Tabasco; discovered by Linden in 1840 in shady gorges in the neighbourhood of Teapa, and later introduced into cultivation by Ghiesbreght.

There is a living plant of this species, which probably provided the material for the figure in the Botanical Magazine, in the Palm House at Kew. It is about ten feet high with a stout, little-branched stem, bare except for the dense crowded tuft of leaves at the apex of each branch which characterizes this section of the genus.

The plant of *O. Theophrasta* on which Regel founded the genus *Wolkensteinia* evidently bore imperfectly developed inflorescences with abnormal flowers.

A fourth member of this section is *Ouratea gigantophylla* (Erhard) Engl., a Brazilian species hitherto known only from the provinces of Bahia and Rio de Janeiro. With this Engler united *O. Theophrasta*, but the latter, though very closely related, may be distinguished by the long narrow subulate stipules.

XI.—AN UNDESCRIBED VARIETY OF TILIA HENRYANA.

C. V. B. MARQUAND.

In 1895 a specimen of a *Tilia* was received at Kew from Mr. W. R. Carles, who had collected it during the previous year in the province of Kiangsu, Eastern China. Another specimen, presented by the U.S. Dept. of Agriculture and collected by Mr. F. N. Meyer in 1915 near Nanking, was subsequently received under the name of "*T. Henryi*", but no authority for this name was stated, and it does not appear to have been published. It is possibly an error for *T. Henryana* Szysl. (figured and described in Hooker's Icones Plantarum t. 1927), with which it most closely agrees but is distinct in the much longer marginal awn-like bristles on the lobes of the leaves, and in the cross nerves of the lamina as viewed from the underside being hardly raised above the mesophyll, also in the almost complete absence of the short rufous pubescence of stellate hairs which is characteristic of the type of that species which is in the Kew Herbarium.

These two specimens agree exactly, but in view of the fact that there are some intermediates, notably "1503 Coll. E. H. Wilson, West Hupeh, July, 1909," it appears to be scarcely worthy of specific rank. It may however be given rank as a distinct variety, and the name var. *Carlesii*, after its collector, is suggested.

Tilia Henryana *Szysl.* var. **Carlesii** *Marquand* var. nov.; a typo differt setis ad apice loborum in margine laminae 8–10 mm. longis (in typum tantum 3–5 mm. longis), lamina infra nervis tertiariis parum conspicuis vix super mesophyllum elevatis, infra laminam vix indumento vestita, interdum fere glabra est, inflorescentia atque altera partes typicae sunt.

CHINA. In silva Hui-ch'ü ssŭ, prope Yangtze flumen inter Nanking et Chinkiang in provincia Kiang-su, Dec., 1895, *W. R. Carles* 559. Prope Nanking, in provincia Kiangsu, June 6, 1915, *F. N. Meyer* 1451.

Mr. Carles states that the specimen was obtained from a Temple named Hui-ch'ü ssŭ, on the slope of a hill Huashan, on the south bank of the Yangtze about halfway between Nanking and Chinkiang.

This variety is highly interesting in that it comprises the extreme form of development of a character by which the type of the species is distinguished from all other Chinese species of this difficult genus. It is said to be a strikingly beautiful tree when growing, and was found in a wood which had escaped destruction, at a time when many in the district were cut down, through being ransomed by the priests of the temple.

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ROYAL BOTANIC GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

No. 4] [1924

XII—A NEW NATIONAL PINETUM.

The need of a site other than Kew where a national collection of conifers and taxads could be grown for purposes of study by botanists, foresters, horticulturists and the public generally, has for many years been manifest. It is true that a very extensive collection of species in a presentable condition may still be seen at Kew, especially of those belonging to *Pinus*, *Cupressus* and the *Taxaceae*, but the best of these attained their present size and character before atmospheric conditions got so bad. Certainly it has been impossible for several decades past to show at Kew creditable examples of most of the spruces and firs, two groups which include some of the handsomest of all conifers.

Through the courteous co-operation of the Forestry Commission a beginning has been made to establish a new national pinetum. After a careful inspection by the Director and Curator of various sites suggested by the Commission, one at Bedgebury in Kent has been selected. The first requisites of such a site are of course a pure atmosphere and a good soil ; it is desirable also that the pinetum should be reasonably accessible. There is no doubt that the area selected at Bedgebury, about fifty acres, meets the first requirements. A specimen of *Abies grandis* 100 feet high, perfect in health and shape, as well as a number of Douglas firs and other conifers of equal quality already growing there. are sufficient proof of that. The contours of the land are also admirable for the display of fine trees, the centre of the area being traversed by a well-made road from which on either side the ground rises fairly sharply. At the lower end a small lake adds to the beauty of the scene and will afford an appropriate setting for *Taxodium distichum* and other moisture-loving conifers. Bedgebury is about ten miles east of Tunbridge Wells

(18018). Wt. 152–28. 1,000. 5/24. Wy & S., Ltd. **Gp. 50** (4.)

and twelve miles south of Maidstone; by train it is most easily reached from Cranbrook Station on the Southern (S.E. and Chatham) Railway.

The Bedgebury property came under the control of the Forestry Commission on April 1st, 1924, and the first task will be to surround the selected area with rabbit-proof fencing. Although fifty acres only have been allotted, the area may in future be indefinitely expanded, for in addition to the maintenance of a botanical collection of species and varieties of all conifers and taxads hardy enough to be grown there, the aim is to plant also experimental plots of likely kinds under forest conditions to test their value for the production of timber. The ground is at present more or less wooded and it will be possible, as areas are cleared for planting, to leave belts of trees for shelter.

In regard to control, the general management will be in the hands of the Forestry Commission, but Kew will supply the trees and superintend the planting of the botanical collection. A joint permanent committee to arrange the lay out, the execution of the work, etc., has been formed, consisting of Sir John Stirling-Maxwell, Dr. A. W. Hill, Mr. W. J. Bean, Dr. A. W. Borthwick and Mr. H. A. Pritchard. The first consignment of over three hundred plants was despatched to Bedgebury from the nurseries at Kew on April 1st, 1924.

XIII.—CONTRIBUTIONS TOWARDS A PHYLOGENETIC CLASSIFICATION OF FLOWERING PLANTS: IV.*

J. HUTCHINSON.

PROPOSED REARRANGEMENT OF FAMILIES COMPRISING THE ARCHICHLAMYDEAE.

Now that the genera of a large number of the families comprising Bentham & Hooker's *Polypetalae* and *Monochlamydeae* have been examined in detail in connection with these studies, it seems desirable that the approximate arrangement of the families resulting from the amalgamation of these groups, the *Archichlamydeae*, should be indicated according to the principles of classification given in the first contribution to this series of papers (*Kew Bull.*, 1923: 73-4). This list of families may prove useful for those who now perhaps find the system of Bentham & Hooker somewhat inadequate, and who may not be in agreement with the later system of Engler & Prantl. In a recent paper before the Linnean Society of London (¹), Parkin made the following remark:—" A linear arrangement of families is, of course, merely a makeshift, but at the same time an unavoidable one. As far as possible it should follow evolutionary lines, and after that its practical value should be consulted. Engler's system in the writer's [Parkin's] opinion fails to fulfil the first condition, and granting this there is no reason in retaining it on the second account, for it is no improvement on Bentham and Hooker's arrangement from the practical point of view. It is a matter of regret that certain recent English systematic publications have been arranged on Englerian lines, thus departing from the long continued practice of commencing British floras with the *Ranunculaceae*."

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* Continued from *K.B.*, 1924, p. 66.

(¹) Parkin in Proc. Linn. Soc. Bot. 1923: 51-65.

During recent years much has been written on the origin of the Angiosperms, and there is now a considerable body of opinion (2) in opposition to the general theory underlying the Englerian System, and in favour of a rearrangement of the Bentham & Hooker System. But beyond the determination of the most primitive group from which a classification should be built up, not much further progress has been made, excepting the work of Hallier in Germany, and the late C. E. Bessey in America. There is not space here to discuss the numerous suggestions of Hallier, some of them rather startling, but the classification proposed by Bessey requires consideration. Bessey had many remarkable and original ideas on phylogenetic classification; but acquainted, as he was no doubt, with little beyond the North American flora, he probably had not the opportunity to acquire a comprehensive knowledge of the constituents of many of the families with which he had to deal. Apart from his rather drastic amalgamation of the *Archichlamydeae* (*Polypetalae* + *Apetalae*) with the *Metachlamydeae* (*Gamopetalae*), some of his suggestions as to affinity are difficult to follow. For instance it would be troublesome to trace the *Ebenales* as finding their origin in any of the families he included in his *Caryophyllales* (Ann. Miss. Bot. Gard. 2: 116). Again, anyone with an intimate knowledge of the families constituting his *Primulales*, i.e. *Primulaceae*, *Plantaginaceae*, *Plumbaginaceae*, *Myrsinaceae*, and *Theophrastaceae*, would probably hesitate to suggest that they had given rise to the *Gentianales*, *Polemoniales*, *Scrophulariales*, and *Lamiales*. One would rather look for the origin of *Ebenales* in some woody family. Then a close study of the genera of *Primulaceae*, *Plantaginaceae*, *Plumbaginaceae*, *Myrsinaceae* and *Theophrastaceae* would probably lead to the conclusion that these families were themselves the ultimate development of various groups of very different affinities in the *Archichlamydeae*, the *Primulaceae*, *Plantaginaceae*, and perhaps part of the *Plumbaginaceae* from *Caryophyllales*, and the *Myrsinaceae* from the *Rhamnaceae*.

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(2) C. E. Bessey in Bot. Gaz. 24: 145-178 (1897). Arber & Parkin in Journ. Linn. Soc. Bot. 38: 29-80 (1907). C. E. Bessey, "The Phylogenetic Taxonomy of Flowering Plants," in Ann. Missouri Bot. Gard. 2: 109-164 (1915).

BASIS FOR A REARRANGEMENT OF THE ARCHICHLAMYDEAE.

As previously contended (*Kew Bull.*, 1923: 70), the convenience of retaining the *Metachlamydeae* (*Gamopetalae*, *Sympetalae*) can hardly be gainsaid, though a rearrangement of the families within this group, and their affinities with the *Archichlamydeae*, will presently be suggested.

It is certain that no linear sequence can adequately express a phylogenetic classification, and the present proposals are based on *the theory of parallel evolution.* Bentham & Hooker's groups *Thalamiflorae* and *Disciflorae* are taken to form the basis of the system. Thus a considerable portion of their classical work in the Genera Plantarum is preserved. The hypogynous petaliferous flower with numerous and free parts is taken to represent the earliest floral type. Several basal groups are then recognised of which the Orders *Magnoliales* (³) and *Ranales* are taken to be the most primitive, and from which most of the other basal groups may be traced. Into this line allied families from the *Calyciflorae* and *Monochlamydeae* are brought into their nearest affinities. In the case of *Magnoliaceae*, however, no petaliferous "Calyciflorae" family, excepting the monotypic *Eupomatiaceae*, is considered to be nearly related, the closest allies after *Anonaceae* being the apetalous *Laurales*, though there is a considerable gap between them. Sometimes the petaliferous Calycifloral group follows immediately after the Thalamifloral basal group and its allies, according to whether the petaliferous or apetalous families are the more closely related. Thus in the group *Caryophyllales*, the apetalous *Polygonales* and *Chenopodiales* precede the petaliferous *Lythrales*, because the former appear to be more closely related to the basal group *Caryophyllaceae* than are the *Lythrales*. But as a rule the more progressive perigynous group comes immediately after the basal hypogynous group.

It should also be made clear that the approximation of families at certain points in this list does not necessarily imply that they are in any way closely related. For instance, *Myristicaceae* (No. 14) is very far removed from *Ranunculaceae* (No. 15) in affinity, although it precedes it in the list. It simply means that *Myristicaceae* is considered to be the most reduced of the families belonging to the *Magnoliales*-*Anonales*-*Laurales* phylum, and is therefore placed at the end of that group. Then we have to start afresh with another primitive family, the *Ranunculaceae*, whence we proceed on the one hand by reduction as far as the apetalous family *Lacistemaceae* and on the other by a progressive series through the *Papaveraceae* to the very natural family *Cruciferae*. Similarly *Lacistemaceae* (No. 30) is not at all related to *Papaveraceae* (No. 31); neither is *Balsaminaceae* (No. 70) to *Lythraceae* (No. 71), nor *Proteaceae* (No. 82)

(³) *See* Hutchinson in *Kew Bull.*, 1921: 186.

to *Dilleniaceae* (No. 83), and so on. These breaks in affinity are indicated by lines. It should also be noted that the Englerian group *Parietales* is considered to be unnatural and is split up, part of it being regarded as the intermediate stage towards syncarpy, the parietal placentation remaining as a fixed character in the most advanced side branches of the herbaceous Ranalean phylum, such as the *Polygalaceae* and *Cruciferae*. Another part of *Parietales* will be found in that part of the arboreal phylum, for the basal type of which I have selected *Dilleniaceae*. These are the *Bixales* which may be regarded as the intermediate stage towards the syncarpous type of flower represented in the *Theaceae* and *Tiliaceae*, and part of the great and mostly arboreal Rosalean (4) plexus. From the last named, and especially by way of a family like *Hamamelidaceae*, the much discussed group "*Amentiferae*" is considered to have been derived by reduction and specialization of the inflorescence, wherein the flowers, having become mainly unisexual and unattractive to insect life, have reverted to the more primitive anemophilous condition. I consider the suggested relationship between *Salicaceae* and *Tamaricaceae* to be due to parallelism and not to true affinity.

The *Tiliales-Malvales* are placed before the Rosalean phylum, although as a whole they are generally more advanced, and the *Euphorbiaceae* follow them. The *Euphorbiaceae* appear to be a heterogeneous mixture of apetalous types probably derived from the *Flacourtiaceae*, *Malvaceae*, *Sterculiaceae*, *Tiliaceae*, *Celastraceae*, and *Olacaceae* and perhaps several other families. Even so it is best to retain it, for convenience, more or less as now defined, but later it is hoped to point out the true affinities of some of its groups. The diagram on p. 118 is intended to illustrate more clearly the views of evolution here put forward.

Perhaps rather too much prominence may have been given to the *woody* and *herbaceous* habit. It is significant, however, that many very natural families are either entirely woody or entirely herbaceous. Examples of the former are *Magnoliaceae*, *Anonaceae*, and *Lauraceae*, etc., of the latter *Ranunculaceae* (5), *Papaveraceae* and *Cruciferae*. And in the rather primitive groups, at any rate, the difference in habit is accompanied by a marked difference in the structure of the stomata: in the woody group the guard-cells are usually accompanied by special subsidiary cells parallel to the pore, whilst in the early herbaceous groups the guard-cells have no special subsidiary cells. It is difficult to suggest just what the significance of this different type of stoma represents. Of course in more advanced groups the two types are often found in the same family, the elements of which are brought together perhaps by parallel

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(4) It is probable that some herbaceous *Rosaceae* have not had a common origin with their ligneous associates.

(5) *Clematis* is very softly woody.

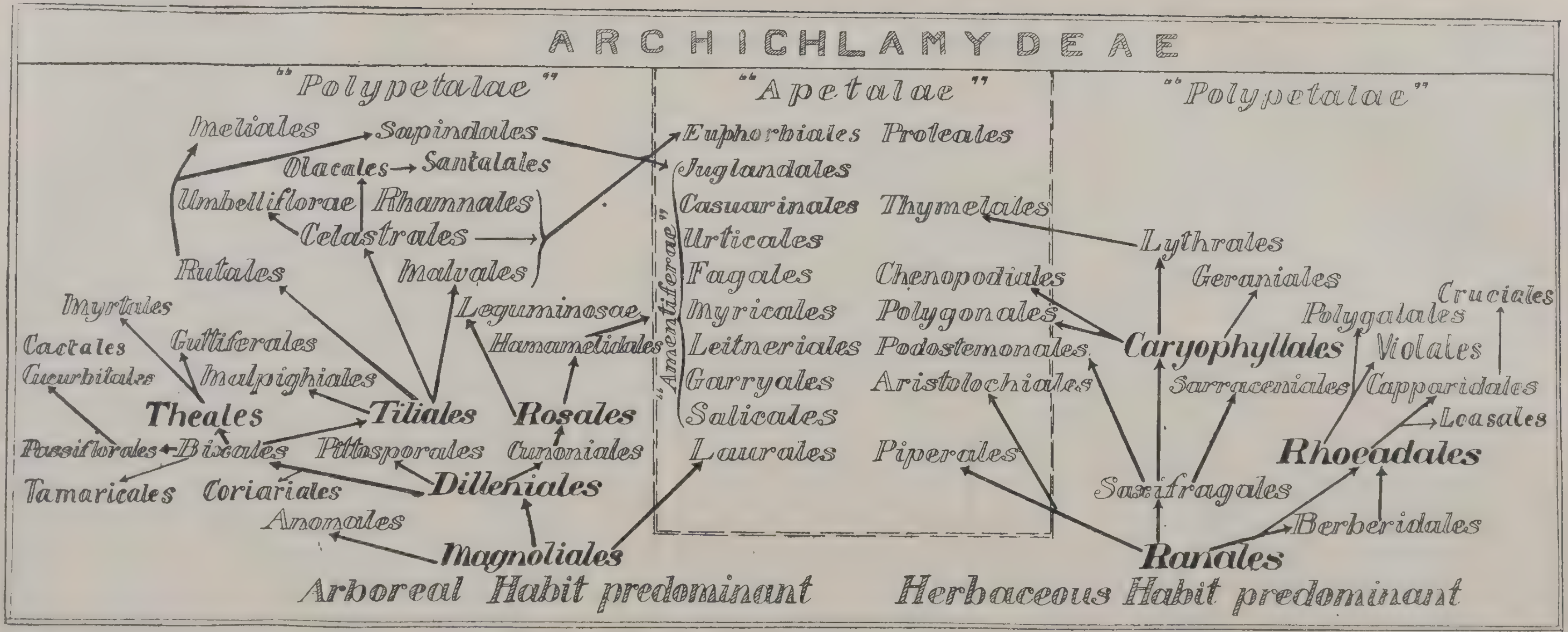

Diagram showing the probable course of evolution of the *Archichlamydeae*. The group is theoretically divided into two, an Arboreal Phylum and a Herbaceous Phylum, starting with the *Magnoliales* and *Ranales* respectively. From these separate but more or less parallel stocks as basal points, an attempt is made to trace the probable development of the other main groups enumerated in the appended list.

evolution. It seems significant that large natural families such as the ligneous *Rubiaceae* should have a characteristic type of stoma.

The sequence of groups set out below aims at bringing nearly related families into closer approximation than formerly, and is an attempt to show the results of parallel evolution and reduction. It should not be forgotten, however, that we have to deal mainly with the results of evolution and have not now before us the complete "phylogenetic tree". Many of the intermediate stages now represented by gaps were probably, during the long course of evolution, quite tentative and experimental and soon gave way to more advanced and permanent types. For it would be quite as absurd to suggest that the family *Fumariaceae* has been evolved from the *Papaveraceae* as they appear in the world to-day, as it would be to say that man has sprung from the existing types of simians. But just as the basal stock of simians may have split up in the dim past into several groups, one of which has developed into the genus *Homo*, so may the *Fumariaceae* have similarly branched off from the ancient papaveraceous stock and developed by a long process into the family as it appears to-day.

Accustomed as the writer has been for nearly twenty years to taxonomic work in a herbarium arranged after the De Candolle System as expressed in the Genera Plantarum of Bentham and Hooker, his proposals for a rearrangement of the *Archichlamydeae* are naturally not a little influenced by that system. A glance at the sequence of families below, however, will show that he has not hesitated to follow the maxim of John Stuart Mill "that any man who seeks the truth must follow his researches to their conclusions wherever they may lead"; and whatever else may be said of the results arrived at so far, no labour has been spared in acquiring them.

Archichlamydeae.

Notes on Affinity (origin and further development).	Sequence of Orders (Cohorts) (1) and Families (2).	General Characteristics (3) of Orders (Cohorts).
	1. Magnoliales Brongn. (emend.)	
Entirely woody groups indicating ancestry of the following also predominantly woody groups beginning respectively with *Dilleniales*, *Cunoniales*, *Tiliales*.	1. Magnoliaceae. 2. Winteraceae. 3. Schizandraceae. 4. Himantandraceae. 5. Lactoridaceae. 6. Trochodendraceae. 7. Cercidiphyllaceae.	Hypogynous; ⚥ becoming ♂ ♀ with reduction; acyclic to cyclic; apocarpous; petals present; stamens ∞, free or rarely in a mass; endosperm copious, not ruminate; embryo minute.
	2. Anonales Lindl.	
More or less fixed types clearly related but more advanced than the above; tropical distribution.	8. Anonaceae. 9. Eupomatiaceae.	Hypogynous to rarely perigynous; ⚥; apocarpous to rarely syncarpous with parietal placentation; petals present, occasionally gamopetalous; stamens ∞, free; endosperm copious, markedly ruminate.

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(1) The Orders (Cohorts) here recognised are much smaller conceptions than those of either Bentham and Hooker or of Engler, and correspond more with the Suborders (Unterreihe) of the latter. So far as possible nomenclature according to priority is used for these groups.

(2) Family names mainly as in Bentham and Hooker, Genera Plantarum, but with many additional segregate families; where Englerian names differ they appear in brackets.

(3) The characteristics given here are quite general and do not account for exceptions, which occur in several of the orders.

3. LAURALES Lindl.

Reductions from the *Magnoliales*, approaching most nearly the *Winteraceae*.

10. Moniniaceae.
11. Lauraceae.
12. Gomortegaceae.
13. Hernandiaceae.
14. Myristicaceae.

Hypogynous to perigynous; ⚥ or ♂♀; cyclic; apocarpous to monocarpellary; no petals; stamens definite, free; endosperm copious, plain or rarely ruminate or absent; embryo minute.

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4. RANALES Lindl. (emend.).

Herbaceous (often with scattered vascular bundles) to softly woody groups (wood of special type probably derived from herbaceous) from which may have been derived the following herbaceous progressive groups beginning with *Rhoeadales*, *Saxifragales*, herbaceous *Umbelliflorae*, and the reduced and degraded *Aristolochiales* and *Piperales*.—Considerable affinity with Monocotyledons.

15. Ranunculaceae.
16. Cabombaceae.
17. [Ceratophyllaceae] ?
18. Nymphaeaceae.

Hypogynous to rarely perigynous; ⚥; hemicyclic to rarely cyclic; apocarpous; petals present; stamens ∞, free; endosperm copious, plain, very rarely absent; embryo minute.

5. BERBERIDALES Lindl. (emend.).

19. Berberidaceae.
20. Circaeastraceae.
21. Lardizabalaceae.
22. Menispermaceae.

Hypogynous; ⚥ to ♂♀; cyclic; one or few free carpels; petals present, small; stamens definite, free; endosperm copious, sometimes ruminate; embryo small to large; herbaceous to low woody or climbing habit; wood often with broad medullary rays.

6. ARISTOLOCHIALES Lindl.

See note under *Ranales*; probably reduced *Berberidales* by way of *Menispermaceae*.

23. Aristolochiaceae.
24. Cytinaceae (Rafflesiaceae).
25. Hydnoraceae.
26. Nepenthaceae.

Hypogynous to epigynous; apetalous; ovary superior, half-inferior to inferior; stamens ∞ to few; parietal to axile placentation; endosperm present or absent; small to large embryo; herbaceous to climbing habit with wood as in *Berberidales*; some parasites with reduction of leaves.

7. PIPERALES Lindl.

Reduced types from the *Ranales*, often with scattered vascular bundles as in *Monocotyledons*.

27. Piperaceae.
28. Saururaceae.
29. Chloranthaceae.
30. Lacistemaceae.

No perianth (usually); ovary mostly superior; placentas parietal to subaxile; endosperm copious; embryo minute.

Herbaceous to more or less woody groups most of which have developed into fixed types and have not given rise to further evolution; gradual increasing zygomorphy of the flower with reduction of stamens and ovules.

8. RHOEADALES Bartl. (emend.) (Rhoeadeae.).

31. Papaveraceae.
32. Fumariaceae.

Hypogynous to rarely subperigynous; ☿; cyclic (except sometimes the stamens); petals present; syncarpous; parietal placentation; stamens ∞ and free to definite; endosperm copious, plain; embryo minute; flowers actinomorphic to zygomorphic.

9. LOASALES (Engl. subord.) (emend.).

33. Turneraceae.
34. Loasaceae.

Hypogynous to epigynous; stamens numerous and sometimes in bundles, to few; syncarpous with parietal placentation; endosperm copious; embryo straight; seeds often strophiolate; flowers actinomorphic.

10. CAPPARIDALES (Engl. subord.).

35. Capparidaceae.
36. Moringaceae.
37. Tovariaceae.

Hypogynous or subperigynous; ☿; petals present; syncarpous with parietal placentation; carpels 2; stamens numerous to few, mostly equal; endosperm absent; embryo variously folded; flowers actinomorphic to zygomorphic.

11. CRUCIALES Lindl. (emend.).

38. Cruciferae.

More or less as above but stamens 6, tetradynamous; petals 4; ovary usually divided by a false septum.

12. VIOLALES Lindl. (emend.).

39. Violaceae.
40. Resedaceae.

Hypogynous to perigynous; ⚥ rarely ♀ ♂; petals present; syncarpous with parietal placentation; stamens several to few; endosperm present or absent; embryo straight or curved;—flowers mostly zygomorphic.

13. POLYGALALES (Engl. subord.).

41. Polygalaceae.
42. Vochysiaceae.
43. Trigoniaceae.

More or less as in preceding, but axile or apical placentation; stamens 8 or less with some infertility and cohesion.

Herbaceous groups closely connected with the *Ranales* (sensu stricto) but slightly more advanced; several small groups given off showing very special leaf morphology and habitat.

14. SAXIFRAGALES Lindl. (emend.).

44. Crassulaceae.
45. Cephalotaceae.
46. Saxifragaceae (sensu stricto).

More or less perigynous to rarely epigynous; ⚥; cyclic; apocarpous to syncarpous with axile placentation; stamens definite, free; endosperm copious; embryo small, straight.

15. SARRACENIALES Engler.

47. Droseraceae.
48. Sarraceniaceae.

More or less as in *Saxifragales*, but plants mostly insectivorous; syncarpous; placentation parietal to axile; stamens numerous to few.

16. PODOSTEMONALES Lindl.
(*Podostemales*).

49. Podostemonaceae.
50. Hydrostachyaceae.

Possibly very much reduced apetalous types of *Saxifragales*, with peculiar habit, but position altogether problematical.

17. CARYOPHYLLALES (Engl. subord.).

A prolific herbaceous group which has given rise to apetalous hypogynous groups such as *Polygonales*, *Chenopodiales*, perigynous petaliferous groups as *Lythrales*, perigynous apetalous groups as *Thymelales* and part of *Metachlamydeae* (*Gamopetalae*).

51. Elatinaceae.
52. Caryophyllaceae.
53. Molluginaceae.
54. Ficoidaceae (Aizoaceae).
55. Portulacaceae.

Hypogynous to perigynous; ⚥; cyclic; syncarpous; axile to free central placentation; stamens mostly definite; endosperm copious; embryo curved.

Reduced degraded types of *Caryophyllales*.

18. POLYGONALES Lindl.

56. Polygonaceae.
57. Illecebraceae.

More or less as in *Caryophyllales* but apetalous; ovary 1-celled, 1-ovuled; embryo straight to curved; endosperm copious; stipules often sheathing, intrapetiolar, membranous or scarious.

19. CHENOPODIALES Lindl.

58. Phytolaccaceae.
59. Cynocrambaceae.
60. Chenopodiaceae.
61. Batidaceae.
62. Amarantaceae.
63. Basellaceae.

As in *Polygonales*, but stipules absent or very small; carpels numerous to solitary; free or connate; embryo curved.

20. GERANIALES Lindl.

Here regarded as advanced more or less fixed types from *Caryophyllales*; considerable gap between the two groups, but affinity evident through *Limnanthaceae* especially.

64. Linaceae (sensu stricto).
65. Zygophyllaceae.
66. Geraniaceae (emend.).
67. Limnanthaceae.
68. Oxalidaceae.
69. Tropaeolaceae.
70. Balsaminaceae.

Hypogynous; ⚥; ovary entire to lobed, syncarpous; ovules mostly 1-2 in each cell; stamens definite; disk glands often present; leaves frequently much divided, stipulate; higher types have zygomorphic flowers and tendency to syngenesious anthers.

21. LYTHRALES (Onagrales Lindl. pro parte).

Herbaceous becoming woody; probably advanced type of *Caryophyllales* through subfamily *Sileneae*.

71. Lythraceae.
72. Sonneratiaceae.
73. Punicaceae.
74. Oliniaceae.
75. Onagraceae (Oenotheraceae).
76. Haloragaceae (Hippuridaceae).
77. Callitrichiaceae.

Actinomorphic; perigynous to epigynous; calyx tubular, valvate; petals present; stamens as many or twice as many as petals; ovules numerous to solitary; placentation axile; no endosperm.

22. THYMELALES (Engl. subord.).

Increasingly woody apetalous relations of *Lythrales*.

78. Geissolomataceae.
79. Thymelaeaceae.
80. Penaeaceae.
81. Nyctaginaceae.

More or less as in *Lythrales* but apetalous, often monocarpellary; ovules few to solitary; flowers often capitate; endosperm present or absent; calyx imbricate or valvate.

23. PROTEALES Lindl.

Origin problematical, but probably allied to *Thymelaeaceae*.	82. Proteaceae.	Perigynous ; actinomorphic or zygomorphic ; calyx valvate, often split down one side ; stamens equal and opposite the sepals ; ovary superior, 1-celled ; no endosperm.

24. DILLENIALES.

Woody to herbaceous somewhat basal group rather remotely allied to the *Magnoliales* and perhaps indicating the origin of the *Pittosporales*, *Bixales*, *Theales*, *Guttiferales* and woody *Rosales*.	83. Dilleniaceae. 84. Crossosomataceae.	Hypogynous ; ⚥ ; apocarpous ; petaliferous ; stamens ∞, rarely definite, free ; endosperm copious, plain ; embryo minute to fairly large ; seeds often arillate ; leaves alternate, with strong pinnate nervation.

25. CORIARIALES Lindl.

Rather doubtfully placed here.	85. Coriariaceae.	More or less as above, but stamens 10 with large anthers, seeds with thin endosperm, not arillate, and leaves opposite or verticillate.

26. PITTOSPORALES Lindl. (emend.).

Might be equally well placed after *Cunoniales*.	86. Pittosporaceae. 87. Tremandraceae.	Hypogynous ; ⚥ rarely ♂ ♀ ; syncarpous with parietal to axile placentation ; stamens definite, free ; petals imbricate to induplicate-valvate ; endosperm copious ; embryo minute.

27. BIXALES Lindl.

Woody to rarely subherbaceous group in which syncarpy with parietal placentation has remained a fixed character; probably the *Passiflorales* and its allies, *Theales*, *Guttiferales*, and *Tiliales* find their origin by way of this group.

88. Bixaceae.
89. Cochlospermaceae.
90. Flacourtiaceae.
91. Samydaceae.
92. Canellaceae (Winteranaceae).
93. Cistaceae.

Hypogynous to perigynous; ☿ to ♂♀; syncarpous with parietal placentation; increasing unisexuality of flowers and some perigyny; stamens numerous to few; seeds with copious endosperm and small embryo.

28. TAMARICALES (Engl. subord.).

Somewhat doubtfully placed here, but probably most nearly related to *Bixales*.

94. Frankeniaceae.
95. Tamaricaceae.
96. Fouqueriaceae.

Hypogynous; ☿; syncarpous, with parietal placentation; tendency to catkin-like inflorescences, small flowers; petals free to connate; stamens mostly definite; seeds often hairy, endosperm present or absent.

29. PASSIFLORALES Lindl. (emend.).

Mostly climbing types related to the *Bixales* and becoming herbaceous; probably some of these also derived from the Papaverian groups.

97. Malesherbiaceae.
98. Passifloraceae.
99. Achariaceae.

More or less as in *Bixales* but no endosperm and corona often present; fruit often stipitate; habit mostly climbing and more herbaceous.

30. CUCURBITALES Lindl. (emend.).

Undoubtedly closely related to *Passifloraceae*, and better placed here than in the *Metachlamydeae* to which Engler assigned them, but wherein they have probably no real relations.

100. Cucurbitaceae.
101. Begoniaceae.
102. Datiscaceae.
103. Caricaceae.

Constantly unisexual; ovary inferior with parietal placentation; endosperm scanty or often absent.

31. CACTALES Lindl. (emend.).

Position rather a problem, but perhaps best placed here; some grounds also for placing next to *Ficoidaceae*.	104. Cactaceae.	Succulent or woody; sepals, petals and stamens mostly numerous and in several series on a tubular axis; ovary inferior, 1-celled with parietal placentas.

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32. THEALES Lindl.

Related to *Dilleniales* and *Bixales* and probably the direct syncarpous line developed from these groups. Discifloral groups such as the *Celastrales* perhaps also closely connected.	105. Theaceae (Ternstroemiaceae) (incl. Pentaphyllacaceae). 106. Marcgraviaceae. 107. Caryocaraceae. 108. Actinidiaceae. 109. Saurauiaceae. 110. Ochnaceae. 111. Ancistrocladaceae. 112. Dipterocarpaceae. 113. Chlaenaceae.	Hypogynous to rarely subperigynous; mostly ☿; syncarpous with axile placentation; stamens ∞, often in several series, free or shortly connate; seeds with scanty or no endosperm; embryo large, straight or curved, rarely spiral; leaves alternate; fruits becoming winged and 1-seeded.

33. MYRTALES (Engl. subord.).

Probably epigynous representatives of the *Theales*.	114. Myrtaceae. 115. Melastomaceae. 116. Combretaceae. 117. Rhizophoraceae.	Mostly quite perigynous representatives of preceding group; mostly gland-dotted leaves; often specialized stamens and characteristic habitats; calyx becoming valvate.

34. GUTTIFERALES Lindl.

Related to *Theales* and showing the same tendency as in the *Malvales*, i.e., stamens gathered into bundles.

118. Hypericaceae.
119. Eucryphiaceae.
120. Qnünaceae.
121. Guttiferae.

Advanced hypogynous types of the *Theales* with opposite leaves often gland-dotted or lined; stamens uniting into bundles (phalanges); no endosperm; sepals always imbricate.

35. TILIALES Hutch.
(Malvales auct. pro parte.)

A fairly advanced group whence considerable evolution is evident, *i.e.*, to *Celastrales*, *Rhamnales* (petaliferous, disciform types) and the bulk of *Euphorbiaceae* (apetalous types). *Tiliales* show affinities backward with *Dilleniales* and *Bixales*.

122. Scytopetalaceae.
123. Tiliaceae
(Elaeocarpaceae).
124. Gonystilaceae.
125. Sterculiaceae.
126. Bombacaceae.

Hypogynous, actinomorphic; ⚥ or ♂ ♀; cyclic; syncarpous with axile placentation; stamens ∞ rarely few and opposite the petals, free to partially united; anthers 2-celled; endosperm copious, rarely 0, embryo fairly large, straight or curved; calyx mostly valvate; leaves alternate, stipulate; indumentum often stellate.—Trees or shrubs.

36. MALVALES Lindl. (emend.).

A very natural group representing a fixed type of the *Tiliales*, and whence little or no further evolution has proceeded.

127. Malvaceae.

Mostly as above but mainly herbaceous or softly woody; calyx always valvate; anthers 1-celled.

37. MALPIGHIALES (Engl. subord.).

Advanced and specialized groups from the *Tiliales*, with special types of indumentum, fruits, etc.

128. Malpighiaceae.
129. Humiriaceae.
130. Erythroxylaceae.

Hypogynous; actinomorphic to subzygomorphic; ⚥; syncarpous with subapical placentation; ovules few; stamens usually definite; endosperm mostly absent.—Often climbers with opposite leaves.

	38. EUPHORBIALES Lindl.	
A composite family probably derived from several sources such as *Bixales*, *Tiliales*, *Malvales*, *Celastrales* and perhaps *Sapindales*.	131. Euphorbiaceae.	Hypogynous; ♂♀; actinomorphic; petals usually absent; syncarpous with 1-2 ovules pendulous from inner angle; stamens various; endosperm mostly copious.
	39. CUNONIALES (Grossales Lindl. pro parte).	
Woody to herbaceous (rare) groups allied to the early *Dilleniales* phylum and *Celastrales* and showing prolific evolution; origin through *Rosales* of the *Hamamelidales* and the so-called "*Amentiferae*."	132. Cunoniaceae. 133. Brunelliaceae. 134. Escalloniaceae. 135. Grossulariaceae. 136. Hydrangeaceae.	Perigynous to epigynous; cyclic, mostly ⚥; apocarpous to syncarpous, with central or parietal placentation; endosperm copious, embryo mostly small; leaves simple or compound.
	40. ROSALES Lindl. (emend.).	
	137. Rosaceae. 138. Chailletiaceae (Dichapetalaceae). 139. Calycanthaceae.	As above but without endosperm; rarely acyclic; embryo large.
	41. LEGUMINOSAE.	
Prolific and highly successful group derived from the *Rosales* through the *Mimosaceae* and *Caesalpiniaceae* and ending in the very natural family *Papilionaceae*.	140. Mimosaceae. 141. Caesalpiniaceae. 142. Papilionaceae.	Progressive Rosalean group with increasing zygomorphy of the flower; free to monadelphous or diadelphous stamens; carpel solitary; no endosperm; embryo large.

42. HAMAMELIDALES Brongn.
(*Hamamelineae*).

Closely allied to the *Rosales* with increasing reduction and unisexuality and specialization of the inflorescence leading up to the "*Amentiferae.*"

143. Bruniaceae.
144. Stachyuraceae.
145. Hamamelidaceae.
146. Eucommiaceae.
147. Myrothamnaceae.
148. Buxaceae.
149. Platanaceae.

More or less as in *Rosales* but the flowers often crowded into heads or catkins; increased unisexuality; ovary often bicarpellary; tendency to apetaly; leaves alternate, mostly stipulate.

43. SALICALES Lindl.

Probably *Salicaceae* finds its true affinity here and not with *Tamaricaceae* or *Flacourtiaceae* as has often been suggested. Resemblance to these two families probably due to parallelism.

150. Salicaceae.

As above but flowers always in catkins and wind-pollinated; placentation parietal; no endosperm; leaves alternate, mostly stipulate.

44. GARRYALES Lindl.

151. Garryaceae.

Dioecious; flowers in catkins; ovary inferior; syncarpous, bicarpellary, 1-celled with apical placentation; endosperm copious; embryo minute; leaves opposite; no stipules.

45. LEITNERIALES Engl.

152. Leitneriaceae.

As above but catkins erect; perianth 0 or rudimentary; ovary superior, 1-celled; placenta parietal; endosperm thin; embryo large; leaves alternate; no stipules.

Reductions from the *Rosales* through *Hamamelidales*.	46. MYRICALES Engl. 153. Myricaceae.	More or less as in preceding, but leaves aromatic and gland-dotted ; placenta basal.
	47. BALANOPSIDALES Engl. 154. Balanopsidaceae.	Resembling the preceding but with two parietal placentas.
	48. FAGALES Engl. 155. Betulaceae. 156. Fagaceae (Cupuliferae).	Perianth small or absent ; ovary inferior or nude, 2-6-celled ; cells 1-2-ovuled ; endosperm absent ; flowers in catkins or spikes, ♂ ♀.
Here regarded as an extreme reduction of the "*Amentiferae*", adapted to dry climatic conditions.	49. CASUARINALES Lindl. (*Casuarales*). 157. Casuarinaceae.	♂ ♀; male flowers spicate, female capitate ; no perianth ; male with one stamen ; seed solitary ; no endosperm ; leaves completely reduced.
Probably a mixed degraded group derived from several of the preceding groups ; *Urticaceae* proper almost entirely herbaceous.	50. URTICALES Lindl. 158. Ulmaceae. 158a. Barbeyaceae. 159. Moraceae. 160. Urticaceae. 161. Cannabinaceae.	☿ or more usually ♂ ♀ ; ovary rarely 2-celled ; ovule solitary, erect or pendulous ; endosperm present or absent ; leaves stipulate.

51. CELASTRALES Benth. and Hook. f.

Perhaps discoid types descended from the *Tiliales* and *Theales*; considerable affinity with *Escalloniaceae*.	162. Ilicaceae (Aquifoliaceae). 163. Empetraceae. 164. Celastraceae. 165. Corynocarpaceae. 166. Cyrillaceae. 167. Cneoraceae. 168. Pandaceae. 169. Hippocrateaceae. 170. Icacinaceae. 171. Salvadoraceae. 172. Stackhousiaceae.	More or less perigynous; disk present, adnate to the base of the calyx tube or lining it; stamens definite, alternate with the petals; petals mostly imbricate; ovules 1-2, erect; placentas mostly axile; endosperm present; leaves simple, without glands.

52. OLACALES.

More advanced types of the preceding group.	173. Olacaceae. 174. Opiliaceae. 175. Octoknemataceae.	As above but petals mostly valvate; ovules pendulous.

53. SANTALALES Lindl. (emend.).

Mostly parasitic representatives of the preceding groups, some of rather doubtful affinity.	176. Santalaceae. 177. Myzodendraceae. 178. Loranthaceae. 179. Balanophoraceae.	Epigynous; calyx valvate or open; stamens opposite to the corolla-lobes when latter present; endosperm mostly present; embryo straight.

54. RHAMNALES Lindl.

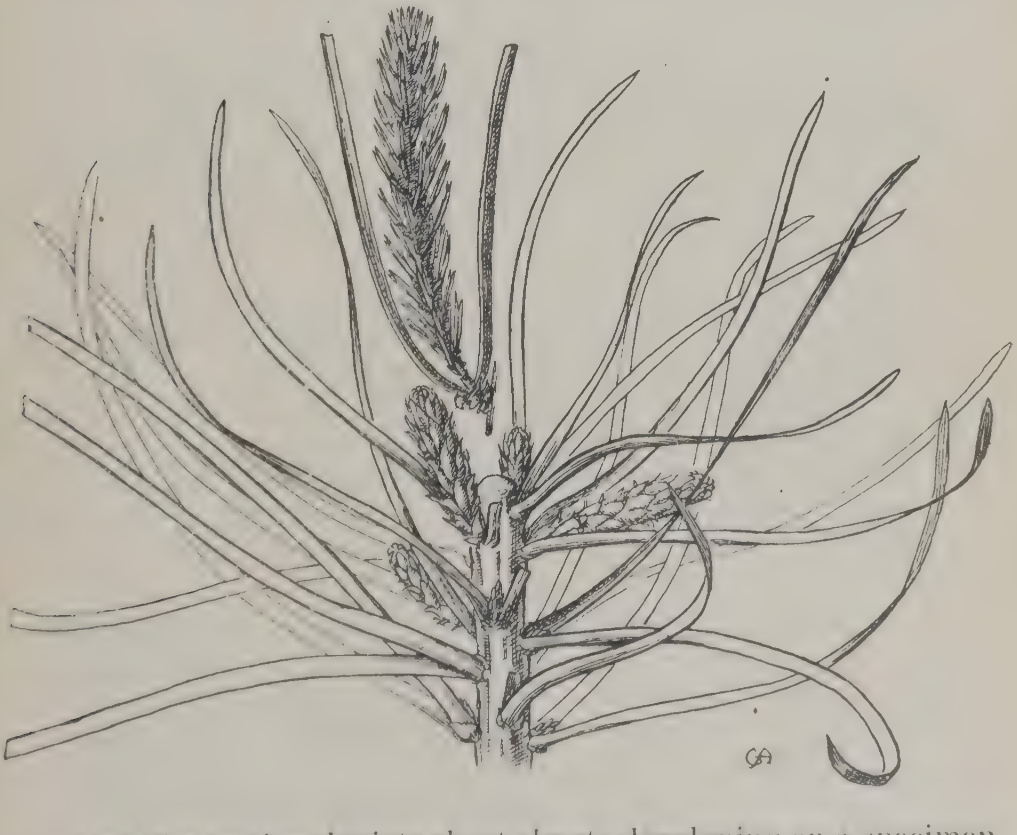
Closely allied to the *Celastrales*.	180. Rhamnaceae. 181. Elaeagnaceae. 182. Heteropyxidaceae. 183. Ampelidaceae (Vitaceae).	More or less as in *Celastrales* but often of climbing habit, and the stamens always opposite the petals; leaves simple to compound; petals imbricate or valvate; endosperm scanty or ruminate.

A large mainly tropical subphylum often spoken of as the "*Pinnatae*", characterized by mostly pinnately or rarely palmately compound leaves; origin and early affinities not very evident; *Sapindaceae* and *Anacardiaceae* especially related to some *Euphorbiacea* .	55. RUTALES Lindl. (emend.). 184. Rutaceae. 185. Simarubaceae. 186. Burseraceae.	Hypogynous to slightly perigynous; ⚥ or ♂♀; apocarpous to syncarpous with axile basal or apical placentation; ovules mostly few; stamens definite, free; petals contorted to valvate; disk mostly conspicuous; leaves often gland-dotted; endosperm present or absent.
	56. MELIALES Lindl. (emend.). 187. Meliaceae.	More or less as in preceding group but leaves usually not gland-dotted and stamens connate into a tube.
	57. SAPINDALES Lindl. (emend.). 188. Sapindaceae (Hippocastanaceae). 189. Aceraceae. 190. Sabiaceae. 191. Melianthaceae. 192. Staphyleaceae. 193. Anacardiaceae. 194. Connaraceae.	Often zygomorphic and ♂♀; petals mostly present; stamens more or less perigynous; ovules 1-2 in each ovary cell; endosperm mostly 0; embryo curved or crumpled.—Trees or shrubs.
	58. JUGLANDALES Engler. 195. Juglandaceae. 196. Julianiaceae.	Flowers in catkins; apetalous; ♂♀; ovary inferior, 1-celled; ovule solitary; no endosperm.
Probably partly derived from the *Celastrales*, *Rhamnales* and *Hamamelidales* groups, but origin or origins doubtful.	59. UMBELLIFLORAE Bartl. 197. Cornaceae. 198. Alangiaceae. 199. Nyssaceae. 200. Araliaceae. 201. Umbelliferae.	Woody to herbaceous; constant and complete epigyny; syncarpous; stamens definite; great specialization of inflorescence with reduction of flowers. Leaves simple or compound.

XIV.—DEVELOPMENT OF SHORT SHOOTS ON PINUS SYLVESTRIS.

K. W. Braid.

Although on the continent reference has frequently been made to the development of the short shoot of *Pinus sylvestris*, little mention of it has appeared in this country. In 1899 Dr. A. W. Borthwick* called attention to the growth of the interfoliar buds in Pines and pointed out that they developed under the stimulus of an increased supply of nutriment. The short shoot could develop in two ways. When all the leaves were eaten away by insects, etc., the dormant bud could produce rosette shoots to take their place, or when an augmentation of nutriment occurred then a branch of unlimited growth might be formed.



Our illustration depicts short shoots developing on a specimen collected recently at Oxshott, Surrey. It was from quite a young plant which, however, had suffered considerably near ground level by rabbit attacks and had lost its terminal shoots as the result of the ravages of *Myelophilus piniperda* L.—the pine-shoot beetle.

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* Trans. & Proc. Bot. Soc. Edin. xxi, 154 (1899).

XV.—THE FORMATION OF A SEED COLLECTION.

The difficulty of using the herbarium collections for the purposes of naming and reporting on samples of seed submitted for identification and unaccompanied by any other part of the plant, has been more and more appreciated as the number of samples submitted has increased. At the present time a considerable number of packets of fruits and seeds are received at Kew annually for determination apart from those accompanying dried material of flowers, leaves, etc. A carpological collection, consisting essentially of large fruits corresponding to material in the herbarium, has been in existence for some time, but until recently there was not at Kew any separate and comprehensive collection of small fruits and seeds.

Systematists are increasingly realising the great taxonomic value of fruits and seeds, and the work of the late Mr. Clement Reid and of Mrs. Reid on Tertiary fossil fruits and seeds has indicated yet another direction in which a seed collection may render useful and easily accessible assistance.

The formation of the present Herbarium collection has been effected by amalgamating samples of seeds and fruits already in the various departments at Kew and also by the generosity of many private individuals and firms. The following are the particulars of the principal collections now amalgamated :

From the Museums and Gardens at Kew - -	1810	samples.
Mr. W. B. Turrill - - - - - - -	1259	,,
Messrs. Carter's (mainly commonly cultivated plants) - - - - - - - - -	584	,,
Mr. F. Escombe—a valuable set of British fruits and seeds from the neighbourhood of Winchester	524	,,
Mr. W. Dallimore (mostly collected in the Gardens) - - - - - - - - -	496	,,
The late Mr. Clement Reid (chiefly British) - -	210	,,
The Misses Harley, Beedings, Sussex, from the collection of the late Dr. Harley - - -	200	,,
Mr. T. A. Sprague - - - - - -	50	,,
Mr. C. E. Hubbard - - - - - -	40	,,
Messrs. Bibby & Sons - - - - - -	27	,,
By exchange (approx.)- - - - - -	100	,,

The collection, which is particularly rich in British species and in species cultivated in gardens in Britain, now comprises 5300 samples, representing 3800 species in addition to varieties.

Whilst it is proposed to make this collection comprehensive and add examples of all kinds of seeds as they may be obtained, special attention will be paid to fruits and seeds of plants likely to occur in gardens or as weeds in crops in this country, and with a view to building up this collection further a number of duplicate samples are available for exchange purposes.

It is hoped that by drawing attention to the existence of this collection research workers will be stimulated to undertake the study of fruits and seeds, a subject hitherto greatly neglected and one which, from many points of view, provides a wide field for research in which many valuable and strikingly new results may be expected.

W. B. T.

XVI.—A REVISION OF EMILIA.

S. GARABEDIAN.

The genus *Emilia* (*Compositae*) was founded by Cassini (1) in 1817. He described it as differing substantially from *Cacalia*, a Linnean (2) genus since included for the most part in *Senecio*, with about three species in *Emilia*.

De Candolle (3) in 1837 enumerated 13 species and referred the two species described by Cassini, *E. purpurea* and *E. flammea*, to *E. sonchifolia* and *E. sagittata* respectively. In the present revision the number of species has risen to 23.

Generic Characters. Capitula many-flowered, homogamous, not rayed; flowers tubular, 5-lobed, elongate; receptacle naked; involucre 1-seriate, ecalyculate; style-branches ending in hispid, short, obtuse or acute cones; achenes hairy or glabrous, strongly or faintly ribbed.

Affinities. This genus has affinities with *Gynura* and *Senecio*. From these it is separated by very slender characters, and one may regard it more as an association of allied species than as a distinct genus. The absence of an external row of bracts to the involucre is a feature which serves to separate *Emilia* from *Gynura*, but links it with one or two species of *Senecio*. The style-branches end as a rule in hispid, short, obtuse or acute cones, but in at least two cases they resemble those of *Gynura* wherein the style-branches have subulate appendages.

Distribution. The genus is not a large one, but certain of the species have become widely spread as weeds, while others are restricted to small areas. The species *E. sonchifolia* and *E. sagittata* are found in Tropical Africa, China, India, Malaya and America; *E. adscendens*, *E. citrina*, *E. graminea* and *E. amplexicaulis* are limited to Madagascar; *E. Walkeri*, *E. zeylanica*, *E. scabra* and *E. ramulosa* to India; *E. angustifolia*, *E. pinnatifida*, *E. javanica* and *E. marivelensis* to Malaya.

KEY TO THE SPECIES.

*Achenes glabrous:
  Flower-heads solitary on very long peduncles, leafy only towards the base; leaves small, sessile, oblong-lanceolate, about 1.8 cm. long, strigillose-pubescent below; involucral bracts nearly equalling the flowers - - - - - - 1. **basifolia.**
  Flower-heads more or less corymbose and shortly pedunculate:

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(1) Bull. Soc. Philom. (April) 1817: 68, and in Dict. Sci. Nat. 14: 405 (1819).

(2) Linn. Sp. Pl. ed. i. 285 (1753).

(3) DC. Prodr. 6: 301.

Leaves auriculate at the base :
Flowers few (about 10) in each head ; leaves ovate-lanceolate ; involucral bracts about 6 ; Tropical Africa - - 2. **protracta.**
Flowers numerous in each head :
Leaves linear-lanceolate ; involucral bracts about 10 equalling the flowers. East Asia - - - - - 3. **prenanthoidea.**
Leaves lanceolate to ovate-lanceolate ; bracts ½ to ¾ as long as the flowers. Tropical Africa - - - - 4. **Macaulayae.**
Leaves not auriculate at the base :
Leaves lanceolate, about 1 cm. wide, entire or undulate on the margin ; heads campanulate :
Involucral bracts about ½ the length of the flowers - - 5. **caespitosa.**
Involucral bracts nearly as long as the flowers - - 6. **angustifolia.**
Leaves linear, rarely more than 5 mm. wide ; heads tubular :
Stems partially decumbent ; flower heads very few with fairly strong peduncles. Madagascar - - - 7. **adscendens.**
Stems erect ; flower heads numerous with slender filiform peduncles. Tropical Africa - - - - 8. **integrifolia.**
**Achenes hairy or papillous on the main ribs only or all over :
†Achenes hairy only on the main ribs :
Cauline leaves much narrowed and not auriculate at the base or petiolate, more or less linear ; heads small, few, usually well under 1 cm. long :
Leaves all linear :
Heads 2–3 together. Madagascar - - - - 9. **graminea.**
Heads solitary. Uganda - 10. **debilis.**
Leaves of two kinds, the lower lanceolate and toothed - - 11. **crepidioides.**
Cauline leaves auriculate at the base :
Basal leaves more or less pinnatifid or partite :

Involucral bracts from $\frac{1}{2}$–$\frac{3}{4}$ as long as the flowers :

Cauline leaves pinnately lobed. Philippines - - 12. **pinnatifida.**

Cauline leaves merely toothed or somewhat lyrate. Madras - - 13. **scabra.**

Involucral bracts about equal to the flowers - - - 14. **sonchifolia.**

Basal leaves not lobed or partite :

Leaves pandurate with broadly winged lower portion and large auricles, the upper part ovate and slightly hastate, slightly undulate ; flower heads about 6, campanulate ; involucral bracts $\frac{1}{2}$–$\frac{3}{4}$ as long as the flowers - 15. **Walkeri.**

Leaves not pandurate or, if occasionally so, then narrowed in the lower portion and only slightly auriculate :

Involucral bracts about equal to the flowers :

Heads corymbose :

Involucral bracts about 0.5 cm. long ; flower heads rather small ; leaves distinctly toothed - - 16. **citrina.**

Involucral bracts about 1.2 cm. long ; flower heads larger ; leaves obscurely toothed. Malaya - 17. **javanica.**

Heads solitary, lower leaves orbicular - - 18. **marivelensis.**

Involucral bracts about $\frac{1}{2}$ as long as the flowers :

Stem leaves more or less ovate :

Heads corymbose - 19. **sagittata.**

Heads solitary or subsolitary :

Leaves linear-lanceolate, not amplexicaul at the base, distinctly toothed. Angola - 20. **albocostata.**

Leaves ovate or oblong, markedly amplexicaul at the base. Madagascar - - 21. **amplexicaulis.**

Stem leaves linear or linear-lanceolate; flower heads few; involucral bracts about ½ as long as the flowers. S. India 22. **zeylanica.**

††Achenes densely hairy all over; leaves entire with recurved margins, setulose-pubescent below; heads solitary on long nude peduncles. India - - - 23. **ramulosa.**

1. **E. basifolia** *Baker* in Kew Bull. 1898: 154.

Tropical Africa. Nyasaland: Zomba, *Whyte*! (type).

2. **E. protracta** *S. Moore* in Journ. Bot. 1905: 48.

Tropical Africa. Rhodesia: Victoria Falls, in and on margin of rain forest, 940 m., *Eyles* 119 (type)! *Allen* 15! Livingstone, *Rogers* 7136! Sesheke distr., *Gairdner* 502!

3. **E. prenanthoidea** *DC.* Prodr. 6: 303; Clarke Comp. Ind. 176; Hook. f. Fl. Brit. Ind. 3: 336; Robinson in Philipp. Journ. Sci. 3: 217.

China. Yunnan: Mengtze, *Henry* 9420! Yunnanfu, *Henry* 201! Chekiang, *Hickin*!

India. Sikkim: Himalaya, alt. 620 m., *J. D. Hooker*! Khasia Mts., alt. 620–1240 m., *Hooker & Thomson*! Burma: Myitkina distr., *Lace* 5556! Kabu valley, *Watt* 6630! Anamallago, *Beddome* 4553! Bengal, *Clarke* 26770!

Philippines. Luzon: Baguio, Province of Benguet, *Williams* 1430! Mindanao: Mt. Malindang, Province of Misamis, *Mearns & Hutchinson*, For. Bur. 4615; Lake Lanao, Camp Keithley, *Mrs. Clemens* 140.

4. **Emilia Macaulayae** *Garab.* sp. nov.

Herba suffruticosa, erecta, ramosa, glabra. *Folia* basalia conferta, 5–6 cm. longa, 1.5–2.3 cm. lata, caulina alterna, sessilia, lanceolata ad ovato-lanceolata apice acuta, basi amplexicaulia, marginibus distante denticulata. *Capitula* corymbosa, circiter 3-nata, campanulata, multiflora; pedunculi satis robusti, 6–7 cm. longi. *Involucri* bracteae 10–15, puberulae, 1 mm. latae, acutae, quam flores aurantiaci ½–¼ breviores. *Flores* tubulosi, 1.3–2 cm. longi; corolla membranacea, 5-loba; antherae apice breviter appendiculatae; styli rami longi, breviter exserti, in appendicem subulatam terminati. *Achaenia* usque ad 2 mm. longa, glabra.

Tropical Africa. N. Rhodesia: Near Mumbwa 15° S., 28 E., *Macaulay* 659! (type). N.W. Rhodesia: Broken Hill, 1300 m., *Rogers* 8050!

5. **E. caespitosa** *Oliv.* in Trans. Linn. Soc. 29: 10 (1873); Fl. Trop. Afr. 3: 406.

Tropical Africa. Tanganyika Territory: Karagwe, *Speke & Grant* 464! (type): "Nyika country," *Wakefield* 12!

6. **E. angustifolia** *DC.* Prodr. 6 : 303 (1837).
Cacalia angustifolia Wall. Cat. 3163, 3164.
Siam. Chiengmai, *Kerr* 1118 ! *Hosseus* 269 ! 489 !
India. Pombara, *Chute* 5801 !

7. **E. adscendens** *DC.* Prodr. 6 : 303 (1837).
Sonchus adscendens Bojer ex DC. l.c.
Madagascar. Mt. Tananarivo, *Bojer* ! *Baron* 833 ! *Scott Elliot* 1750 !

8. **E. integrifolia** *Baker* in Kew Bull. 1895 : 69.
Tropical Africa. Kenya Colony : Londiani, 2,800 m., *Battiscombe* 510 ! Uganda : Elgon distr., *Sir Evan James* ! *Dummer* 1009 ! Nandi Plateau, *Sir Harry Johnston* ! Masai country, Lykipia, *J. Thomson* ! Ruwenzori, *Scott Elliot* 6864 ! Ankole, *Dawe* 396 ! Usain Gishu Plateau and Trans Nzoia, *Dowson* 686 ! Eldama ravine, *Whyte* ! N. Nyasaland : Fwambo, 1700 m., *A. Carson* 102 ! Lower Plateau north of Lake Nyasa, *J. Thomson* !
South West Africa. Okanakasewa, *Dinter* 882 !

9. **E. graminea** *DC.* Prodr. 6 : 303 (1837).
Sonchus gramineus Bojer ex DC. l.c.
Madagascar. Mt. Tananarivo, *Bojer* ! (type) ; Ambohimitombo, *Forsyth Major* 269 ! 615 ! *Baron* 1739 !

10. **E. debilis** *S. Moore* in Journ. Linn. Soc. 37 : 172 (1905).
Tropical Africa. Uganda : Ruchigga ; *Bagshawe* 444 !

11. **Emilia crepidioides** *Garab.* sp. nov.

Herba parva, debilis, decumbens. *Folia* inferiora conferta, lanceolata, dentata, 1.5–3 cm. longa, infra glauca, superiora linearia marginibus undulatis. *Capitula* graciliter longe pedunculata, solitaria vel subsolitaria, minima, vix 0.5 cm. longa, pauciflora, cylindrica. *Involucri* bracteae circiter 5, glabrae, latae, quam flores roseas circiter $\frac{1}{4}$ breviores. *Flores* tubulosi ; antherae apice exappendiculatae ; styli rami breves, appendice conico-terminali. *Achaenia* 5-costata, in costis pubescentia.

Central Madagascar. Ampasiri-Baihe, near Antananarivo, *Hildebrandt* 2463 ! (type).

12. **E. pinnatifida** *Merrill* in Philipp. Journ. Sci. i : Suppl. 243 (1906).
Philippine Islands. Luzon : Bugias, Province of Benguet, *Merrill* 4265 ! 4664 ! *Elmer* 6599 ! 6606.

13. **E. scabra** *DC.* Prodr. 6 : 304 ; Wight Ic. t. 1123 ; Gamble Fl. Madras 4 : 716.
E. sonchifolia var. *scabra* Hook. f. Fl. Brit. Ind. 3 : 336.
India : Anamallago, *Beddome* 4550 ! Nilghiri, *Hooker & Thomson* ! Gundattu Shola, Pulneys, *Bourne* 2704 !

14. **E. sonchifolia** *DC.* Prodr. 6 : 302 ; DC. in Wight Contrib. 24 ; Miq. Fl. Ind. Bat. 2 : 101 ; Kurz in Journ. As. Soc. 1877, pt. 2 : 194 ; Oliver Fl. Trop. Afr. 3 : 405 ; F. Vil. Nov. App. 120 ; Naves in Fl. Filip. ed. 3 : t. 282 ; Hook. Fl. Brit. Ind. 3 : 336 ; Mart. in Nuov. Giorn. Bot. Ital. 15 : 300 ; Vid.

Phan. Cuming. Filip. 122; Rev. Pl. Vas. Filip. 164; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 23: 449; Merr. Govt. Lab. Publ. 27: 56; Hayata in Journ. Coll. Sci. Tokyo, 18: Art. 8. 26; King & Gamble Mat. Fl. Malay Penin. 16: 38; Gamble Fl. Madras 4: 716.

Cacalia sonchifolia Linn. Sp. Pl. 835 (1753). *E. purpurea* Cass. Dict. 34: 393. *E. rigidula* DC. Prodr. 6: 302.

DISTRIBUTION: Warm parts of Africa and Asia, Japan, and introduced in America.

CHINA. Hong Kong, *Urquhart*! Formosa, *Oldham*! Hainan, *Henry* 8077! Hupeh, *Henry* 7595! Pakhoi, *Playfair*! *Faurie* 15797! Foochow, *Carles* 813! Chekiang, *Faber* 158! *Hickin*! Takow, *Henry* 2088! Mengtze, *Henry* 13790! Swatow, *Perry*! *Maclagan*!

JAPAN. Nagasaki, *Maximowicz*!

INDO CHINA. Tonkin, *Balansa* 842! 3066! Siam; Bangkok, *Kerr* 3768! Anam, *Kuntze* 3597!

PHILIPPINES. Parang, *Loher* 3690! Benguet; Data, Tonglon, *Loher* 3691! 3692! Luzon; Manila, San Francisco del monte, *Loher* 3693! 3694! *Borden*, For. Bur. 2116! *Meyer*, For. Bur. 2175! *Merrill* 3944! 3282! 6668! *Cuming*! Island of Mindor, *Merrill* 3318! Panay, *Copeland* 119!

MALAY ARCHIPELAGO. "Indian Archipelago," *Seemann* 2343! Brit. N. Borneo; Tenom, *Gibbs* 2675! Bangarmassing, *Motley* 708! Java, *Horsfield*! Celebes, *Savinierre*! Timor, *Riedel*!

CEYLON. Colombo, *Thwaites* 3343!

INDIA. Madras, *Shuter*! *Sauliere* 308! 385! *Cole* 49! 57! Simla, *Collett* 393! Koli near Simla, *Drummond* 1812! Poona, *Jacquemont* 1119! Bundelkhand, *Duthie* 6411! Agra district, *Duthie* 6419! Moradabad, *Hooker*! Surinan, *Hostmann*! *Berthoud Coulon* 2151! Almora, 1600 m. alt., *Strachey & Winterbottom*! Sillett, *Wallich*! Sikkim, *Hooker*! Khasia, *Hooker & Thomson*! Assam, *Craib* 154! Shan Hills, *Collett* 830! Bombay, Belgrave common, *Ritchie*! Concan, *Law*!

TROPICAL AFRICA. Northern Nigeria: Vom, Bauchi Plateau, 1,000 m.–1,500 m. alt., *Dent-Young* 159! Gabon: Libreville, *Debreaux* 178! Angola: Huilla, in Morro de Lopollo, *Welwitsch* 3580! 3583! Port. E. Africa, Quilimane, *Kirk*! Zambesi delta; Mambucha and Vicente, *L. Scott*! Nyasaland: Mt. Milanje, *Whyte*!

MAURITIUS. *Bojer*! *Telfair*!

15. **E. Walkeri** *Hook. f.* Fl. Brit. Ind. 3: 337 (1881).

E. prenanthoidea Thwaites Enum. 167, in part, not of DC.

CEYLON. Ramboddie and Newera Ellia, Central Prov., *Walker*! *Thwaites*!

16. **E. citrina** *DC.* Prodr. 6: 303 (1837).

Cacalia citrina Bojer ex DC. l.c.

MADAGASCAR. Near Tananarivo, *Bojer*! *Gerrard* 172!

Baron 6504 ! *Bowles* ! *Major* 49 ! 363 ! *Parker* ! *Hildebrandt* 3514 ! *Deans Cowan* ! *Forbes* !

17. **E. javanica** *C. B. Robinson* in Philipp. Journ. Sci. 3 : 217 (1908).

Hieracium javanicum Burm. Fl. Ind. 174, pl. 57. f. 1. (1768). *Prenanthes javanica* Willd. Sp. Pl. 3 : 1534 (1804).

Philippines. Luzon : Province of Benguet, *Williams* 1438 ! *Mearns* 2789 ; Prov. of Zambales, Mt. Tapulao, Bur. Sci. 4786 ; Ramos, Prov. of Bataan, Lamao river, *Elmer* 6668, 6999, *Merrill* 3944, *Foxworthy* 1594, *Borden* 2116, *Meyer* 2175. Mindanao : Cotabato, *Copeland.*

18. **E. marivelensis** *Elmer* Leaflets Philipp. Bot. i. 362 and 148 (1906).

Tropical Africa. Zanzibar (according to Elmer).

Philippines. *Marave* 74 ; Luzon ; Mt. Mariveles, Prov. of Bataan, *Merrill* 3282 (type).

19. **E. sagittata** *DC.* Prodr. 6 : 302 ; Oliv. Fl. Trop. Afr. 3 : 405 ; Miq. Fl. Ind. Bat. 2 : 102.

Cacalia sagittata Vahl. Symb. 3 : 91. excl. syn ; C. *sagittata* Willd. Sp. Pl. 3 :1731 ; *C. coccinea* Curt. Bot. Mag. tab. 564. *Emilia flammea* Cass. Dict. 14 : 406, atlas 3, pl. 5. *Cacalia bicolor* Roxb. Fl. Ind. 3 : 412. *Emilia sonchifolia* Benth. in Hook. Niger Fl. 439, non DC. *Cacalia humifusa* Bojer in litt. 1835. *Emilia humifusa* DC. 1. c. *Cacalia pumila* Bojer in litt. 1835 ex DC. 1. c. *Emilia pumila* DC. 1. c.

China. Pekin, *Bretschneider* 417 !

Japan. Yesso, *Maries* !

Indo China. Siam : Chiengmai, *Kerr* 1118 ! *Hosseus* 269 ! 489 !

India. Moradabad, *Thomson* 840 ! Concan, *Stocks* ! Madras; Kodaikanal, *Bourne* 1113 ! 1114 ! Khasia, *Clarke* 17486 !

Tropical Africa. Sierra Leone ; near Wilberforce, *Scott Elliot* 3998 ! on the way to Lester Peak, *Scott Elliot* 3852 ! Freetown, Mt. Aureole, *Dalziel* 996 ! Liberia ; within 6 miles of Monrovia, *Sir H. Johnston* ! Gold Coast ; *Farmar* 428 ! S. Nigeria ; Agola, *Thomas* 78 ! Akwa, *Thomas* 32 ! Abbeokuta. *Irving* ! Lagos Colony, *Sir W. Macgregor* 44 ! 114 ! *Moloney* ! swampy parts of Ikoyi plains, *Dalziel* 1163 ! Niger, *Barter* ! N. Nigeria ; Lokoja distr., *Parsons* 99 ! *Dawodu* ! Abinsi. *Dalziel* 664 ! Cameroon ; Lolodorf, *Staudt* 346 ! *Preuss* 1156 ! *Braun* ! Ambas Bay, *Mann* 731 ! Central Africa ; Monbuttu, near Munsa's Dorf, *Schweinfurth* 3368 ! Gabon ; Sibange Farm. Munda, *Soyaux* ! Lower Congo : Loukoungo, *Hens* 269 ! Dundusana, *Morteban* 103 ! Angola ; among mts. of Sobato de Bumba Andala, rather rare, *Welwitsch* 3575 ! 3576 ! 3577 !

3578! 3928! Golungo Alto, about Sange, *Gossweiler* 2430! 3576! Malange distr., *Gossweiler* 1205! Between Chibia and Quihita, *Pearson* 2243! Road to Bembe, flowers scarlet, *Monteiro*! Chitanda, *Baum* 182! Nkando, 900 m., *Dawe* 95! Southern Abyssinia; between Karrar and Addis Ababa, *Wellby*! *Cockburn*! Uganda; Banda, *Dummer* 2442! Busoga, *Brown* 288! Unyoro, *Brown* 399! Ankole, *Roscoe*! Zanzibar; *Last*! *Goodwin*! *Lyne* 16! *Hildebrandt* 1024! *Speke and Grant*! *Bojer*! *Kuntze*! Usaramo, *Stuhlmann*! *Hoffmann* 2025! Amboni, *Kassner* 9! Tanganyika; Chifumbazi, *Nicholson*! Fringa, *Goetze* 651! Uhehe, *Goetze* 685! *Wakefield* 12! Namasi, *Cameron*! Shire valley, *Kirk*! Shire Highlands, *Adamson*! Mozambique, *Forbes*! *Johnson* 220! Quilimane, *Scott*! Moramballa, *Kirk*! Mundala, *Scott*! Manganja Hills, *Meller*! Ribé, *Wakefield*! Randinba Hills, *Stocks*! S. Rhodesia; district Manica, Umtali, *Teague* 16! *Cecil*! Mazoe, *Eyles* 288! Melsetter, *Swynnerton* 4188!

NEW GUINEA. Between Owen Stanley Range and S. coast, *Rose* 36!

PHILIPPINES. Mt. Mariveles, Luzon, *Elmer* 6999! Baguio, *Williams* 1430! Oahu, *Heller* 2296!

MEXICO. Orizaba, *Saunders* 19!

WEST INDIES: S. Vincent, *Guilding*!

COLOMBIA; Envijado, Antioquia, *Lehmann* 7489!

20. **E. albocostata** *Hiern* Cat. Welw. Afr. Pl. i. 596 (1898).

TROPICAL AFRICA. Angola: Mossamedes, *Welwitsch* 3573!

21. **E. amplexicaulis** *Baker* in Journ. Linn. Soc. 20: 190 (1883).

MADAGASCAR. *Bojer*! *Meller*! *Baron* 1603! *Major* 50! *Bowles*! *Hildebrandt* 3233!

22. **E. zeylanica** *C. B. Clarke* Comp. Ind. 175 (1876); Hook. f. Fl. Brit. Ind. 3: 336; Gamble Fl. Madras 4: 716.

E. prenanthoidea Thwaites Enum. 167 in part, not of DC.

CEYLON. Central Province, *Thwaites* 430! *Gardner* 422! *Walker*! *Thomson*! Kandy, *Moon*!

MADRAS: Kodaikanal, *Bourne* 1116! 2706! Kukal, *Bourne* 2705!

Var. **paludosa** *Gamble* Fl. Madras 4: 716.

MADRAS: Kodaikanal, *Bourne* 690! 1115! Makklamputti Shola, *Bourne* 319!

23. **E. ramulosa** *Gamble* in Kew Bull. 1921: p. 120, and in Fl. Madras 4: 716.

S. INDIA. Attraymallay hills: Travancore, 1580 m., *Beddome* (Herb. Madr.); Agastiamalai, Tinnevelly, *Barber* 2930! Kalivayalpil, Tinnevelly, *Barber* 3053.

XVII.—CITHAREXYLUM BESSONIANUM.

T. A. Sprague.

In 1878 a dried specimen of a plant cultivated in the Botanic Garden, Palermo, under the name *Citharexylum Bessonianum* Tod., was received at the Kew Herbarium from the late Professor Todaro. It was found to agree with a specimen, received in 1869 from Mr. W. W. Saunders, of a plant cultivated at Torquay, and said to be "from the Himalayas." Further material of the species was sent to Kew for identification as "an old garden plant" by the late Dr. M. T. Masters in 1895; and additional specimens were received from the Cambridge Botanic Garden in 1903, where it had been cultivated as "*Lippia japonica*", and from other sources. The species is still in cultivation at Cambridge, and is now represented in the Temperate House at Kew.

The name *Citharexylum Bessonianum*, though current in gardens in this country, and doubtless also in the Mediterranean region, does not appear to have been published. During an unsuccessful attempt to trace the publication of *C. Bessonianum*, however, it was discovered that the species had been known during the period 1863–1905 under seven other names in the genera *Ligustrum*, *Lippia* and *Citharexylum*. It was published in 1863 as a new species, *Ligustrum spicatum* Jacques (Rev. Hort. 1863, 339). Jacques stated that his nephew, M. Verdier, had obtained seeds from Messrs. Vilmorin, who had received them from Mexico. He described it as an evergreen shrub about 1 m. high, with blackish-brown bark, the old stems very rugose, the young stems smooth and very glabrous; leaves opposite, shortly petioled, ovate-lanceolate, entire or sometimes denticulate at the apex, green and glossy on the upper surface, paler beneath; "spikes" simple, terminating the lesser branches and branchlets, slender, slightly arcuate; flowers shortly pedicellate, bracts about the same length as the pedicels; calyx brownish, almost entire; corolla tube short, a little longer than the calyx, yellowish; limb pale rose-violet, hardly 4–6 mm. in diameter, composed of five rounded spreading lobes; throat fimbriate.

Jacques remarked that the five-lobed corolla and the American origin of the species suggested that it should be excluded from *Ligustrum* (*Oleaceae*); and Thuret, who had it in cultivation at Antibes, transferred it to *Lippia* (*Verbenaceae*) as *Lippia ligustrifolia*[*] or *L. ligustrina*[†]. According to Dippel[‡] the species appeared in Van Houtte's Catalogue for 1887 as *Citharexylum ligustrinum*. Dippel does not appear to have seen specimens, as his description is based on that of Jacques.

In 1905 Greenman published a description of a supposed new species, *Citharexylum Pringlei*, based on a plant collected by

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[*] Decne in Fl. des Serres, sér. 2, xii. 11 (1877).

[†] Decne in Nouv. Arch. Mus. Par. sér. 2, ii. 38 (1879).

[‡] Handb. Laubholzk. i. 53 (1889).

Pringle (No. 8932) in the State of Hidalgo, Mexico. This number is represented in the Kew Herbarium, and is undoubtedly conspecific with *C. Bessonianum*. Greenman was the first to supply a good description of the species and it is, therefore, unfortunate that the name *Citharexylum Pringlei* cannot be retained. *C. Pringlei*, however, agrees so well with the description of *Ligustrum spicatum* Jacques that there can be little doubt that the two are conspecific. As Greenman remarks, "the glabrous character of the plant, with the smooth shining upper surface of the leaves, the gracefully recurved racemes and the bicolorous corollas, render this species of easy recognition, and readily separated from all known species of the genus". The presence of an occasional leaf which is dentate towards the apex is an additional diagnostic character. The species should accordingly be known as *Citharexylum spicatum* (Jacques) under International Rules. Its synonymy and geographical distribution are as follows :—

Citharexylum spicatum (*Jacques*) *Sprague*, comb. nov. *Ligustrum spicatum* Jacques in Rev. Hort. 1863, 339. *Ligustrum multiflorum* Hort. ex Jacques, l.c. *Ligustrum amurense* Hort. Sahut ex Decne in Fl. des Serres, sér. 2, xii. 11 (1877). *Lippia ligustrifolia* G. Thuret ex Decne, l.c. *Lippia ligustrina* G. Thuret ex Decne in Nouv. Arch. Mus. Par. sér. 2, ii. 38 (1879). *Citharexylum ligustrinum* Cat. Van Houtte, 1887 ; Dippel, Handb. Laubholzk. i. 53 (1889). *Citharexylum Pringlei* Greenm. in Proc. Am. Acad. xli. 243 (1905). *Citharexylum Bessonianum* Tod. MSS. in Hort. Panorm. et in Herb. Kew.

MEXICO. Hidalgo : Barranca below Trinidad Iron Works, 1500 m., fl. July, *Pringle* 8932.

In its native country *C. spicatum* attains a height of 3–5 m., according to Pringle. As grown in England it is a comparatively small shrub and though in some places it can be grown in the open with the protection of a wall, as a rule it is not hardy.

XVIII.—A REVISION OF PASSERINA.

D. THODAY.

The genus *Passerina* is readily distinguishable from other S. African *Thymelaeaceae* by ericoid leaves with a groove on the upper side lined with hairs, and small wind-pollinated flowers with exserted stamens, dusty pollen and penicillate stigma. The absence of scales or other outgrowths of the receptacle and the strictly ericoid leaves distinguish it from microphyllous species of *Lachnaea*.

It is on the other hand a genus in which, owing to the small size of both leaves and flowers, the characters that distinguish the species from one another are apt to be overlooked or to have their value underestimated. Moreover the leaves and bracts are difficult to describe concisely with a terminology devised mainly for the description of flat leaves. It is hardly surprising, therefore, that the early diagnoses were often inadequate, especially in view of the small range of material on which they were based.

Unfortunately, in his conspectus of the genus in De Candolle's Prodromus (xiv., pp. 561–3), where he first restricted it within the limits since recognised, Meisner seems to have depended mainly on descriptions without type specimens, although in dealing with Drège's specimens in Linnaea (xiv., p. 400) he had already expressed doubts as to the validity of the characters on which species had been founded. He therefore misapplied names and perpetuated much of the existing ambiguity.

My attention was drawn to the unsatisfactory classification of the genus by the failure of attempts to identify with the Flora Capensis forms which experience in the field had shown to be distinct. Reference to the available herbaria only served to show that others had not been more successful, and that the existing classification had been based to a large extent on relatively superficial characters.

In undertaking to remedy the confusion I started with the advantage of an acquaintance in the field with several species, one from the Tulbagh Valley and others from the Cape Peninsula. Of the latter each has its characteristic habitat, but there is just sufficient overlapping to demonstrate that they are not merely habitat forms. I have since collected most of the more important species in different parts of South Africa. I have also seen all the specimens of the genus in the various South African herbaria and I gladly take this opportunity of thanking those to whose courtesy I am indebted for the loan of specimens or for other facilities, and also those who have from time to time collected and sent me additional specimens.

The available specimens were first sorted without reference to literature or previous identifications, and then further studied and compared. Interesting confirmation of the soundness of the resulting classification was afforded by the orderly geographical distribution which revealed itself as the work proceeded.

Finally I was able, through the courtesy of Sir David Prain and Dr. Stapf, to work through the sheets in the Herbarium at Kew and also to see Thunberg's specimens kindly sent to Kew from Upsala by Dr. Juel. I am also indebted to Dr. Daydon Jackson for the opportunity of examining the specimens in the Linnean Herbarium and to Dr. Rendle for allowing me to work through those at the British Museum.

I have now, I believe, seen all the important type specimens and can therefore apply the existing names with some confidence.

REMARKS ON NOMENCLATURE. The application of the Linnean names requires some comment.

In the Linnean Herbarium there are four specimens under the name *Passerina* which come within our purview. Of these two are named in Linné's hand[1]. That named by him *P. filiformis* is one of Clifford's specimens. Linné probably had it before him when he wrote the first edition of Species Plantarum and it is probably this specimen which is enumerated, by the underscoring of *P. filiformis* in an interleaved copy of that work, as having been in his possession in 1753[2]. It belongs to a form which is locally common in the Cape Peninsula, where it was probably collected. It is, however, quite distinct from the commonest Cape Peninsula species, which was better represented in the early herbaria and has been known hitherto by the same name. There is nothing in Linné's description to differentiate between the two, and I therefore take his own specimen as the type of *P. filiformis*. The other is Meisner's *P. filiformis* α *vulgaris*. It is the commonest species in the Cape Province and I propose for it the name *P. vulgaris*.

The second specimen is named by Linné *Passerina ericoides*. It proves to be Meisner's *Chymococca empetroides*. The description in Mantissa Plantarum fits it well. In particular " corollis globosis " and " corollae tubus globosus, inflatus " could not apply to any other species. As *Passerina rigida* has a fleshy fruit Meisner's genus *Chymococca* cannot be upheld and the name *P. ericoides* must be retained for the form to which Linné applied it.

In Thunberg's Herbarium there are three sheets named by him *Passerina glomerata* α, β and γ respectively. The first of these must be taken as his type for the species. It is the only one to which " foliis . . . truncatis " applies (Prodromus p. 75). The specimen was probably collected not far from the Tulbagh Valley. It does not occur in the Cape Peninsula and the locality given in Thunberg's Flora Capensis—" Hout Bay and elsewhere "—applies particularly to his *P. glomerata* β.

The other two sheets bear names in pencil in handwriting which I have identified as Wikstrom's by comparing it with signed letters in the Library at Kew. Thunberg's *P. glomerata* β is named *rigida* and his *P. glomerata* γ is named *paleacea*. Clearly these are the specimens referred to by Wikstrom[3] as seen by him in Herb. Thunb., and I take them as the types of his two species.

The name " *divaricata* " on another sheet in the same hand identifies Wikstrom's *P. filiformis* var. *divaricata* with *P. falcifolia* of C. H. Wright.

Meisner[4] did not make any new species, but gave varietal rank to the new forms he recognised. Of these some can be identified with forms here distinguished : the synonymy is given under the species.

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(1) The unnamed sheets, one of which is *Sparrman* 161, are both *Passerina paleacea* Wikstr.

(2) Daydon Jackson : Index to Linn. Herb., Suppl. to Proc. Linn. Soc. London, 1912.

(3) J. E. Wikstrom, Kongl. Vet. Acad. Handl. 1818, pp. 322-5.

(4) DC. Prodr. loc. cit.

Of the new species given in the Flora Capensis I retain *P. falcifolia*, *P. comosa*, *P. Galpini*, and *P. rubra*.

On the other hand *P. laniflora* must be excluded as the type specimen is a *Lachnaea*. I think it advisable, in order to avoid confusion, to reject also the name *corymbosa*. Specimens of three distinct species are quoted under it: the description fits none of these well, but *P. glomerata* of Thunberg better than the others.

Of Gandoger's two species *P. eriophora* is *P. rigida* of Wikstrom. From the locality given for *P. hamulata* I judge it to be probably *P. paleacea* Wikstr. The description would not fit any other species known to occur on "sand dunes near Wynberg" (Cape Flats), but is insufficient to confirm the identification without the specimen.

When the available names are correctly applied there are several species still unnamed. I have proposed names for these. There is a small residuum of specimens of uncertain identity or representing additional forms inadequately. These are quoted with comment. I have not so far had the opportunity of working through the Continental herbaria. All the specimens quoted have been seen by me, unless otherwise stated.

I propose to deal with the interrelationships of the species and their geographical distribution elsewhere in their general bearings. The impression created is of a constellation of forms which have diverged from a common stock in relation to different habitats. These forms do not fall readily into groups of which the members could be regarded as varieties of variable species. Intermediate forms are lacking. Those species with a wide range retain their characters with little variation even when their range includes considerable differences of climate, and there is no evidence that even the rare and local forms are merely local forms in the technical sense.

The evidence is, however, by no means complete. Not only are there large parts of South Africa relatively remote or inaccessible remaining to be thoroughly explored, particularly the mountain ranges, but even in better known parts of the country the *Passerinae* must often have been passed over by collectors, partly because they were regarded as common and well known, partly because their restricted flowering season has been missed. It may be expected, therefore, that further field work will extend the known range of some species and perhaps add to the number of local species.

From the generalised impression recorded above, that each species has its own characteristic habitat, or range of environmental conditions, it is clearly desirable that future records should be accompanied by details as full as possible of the exact locality of the specimen, its situation, habitat (including geological data), and other plants growing in close association with it (especially those locally common).

Passerina *Linn.* Gen. Pl. 341; Meisn. in DC. Prodr. xiv. 561; *Chymococca* Meisn. l. c. 565.

Flowers hermaphrodite, 4-merous. *Receptacle* usually flask-shaped, without scales; lower part enclosing the fruit, persistent or ultimately splitting and falling off. Hypogynous scales none. *Sepals* 4, patent, sub-equal, nearly as long as the receptacle tube; lateral sepals enclosing the inner in the bud. *Petals* none. *Stamens* 8, exserted; four longer opposite and sub-equal to the sepals, four shorter alternating with them, all inserted at the top of the receptacle tube; anthers dehiscing by longitudinal slits; pollen dusty. *Ovary* superior, sessile, ovoid, one-celled; style slender, laterally inserted near the top of the ovary; stigma mop-like, closing the mouth of the tube. *Ovule* solitary, anatropous, pendulous, attached near the base of the style. *Fruit* indehiscent, one-seeded, included in the persistent base of the receptacle-tube, or ultimately becoming free from it; pericarp membranous or fleshy. *Seed* with black crustaceous testa, the micropyle forming a curved beak. Embryo straight, cotyledons fleshy, plano-convex. Endosperm fleshy, surrounding the embryo.

Ericoid shrubs; branches slender, pubescent, tomentose or woolly when young. Leaves opposite, decussate, small and narrow, concave or closely involute, lined within with woolly hairs. Flowers small, reddish or yellowish, wind-pollinated, in the axils of bracts more or less dilated, without bracteoles, arranged in spikes, sometimes sub-capitulate, terminal or ultimately left behind by further growth of the branch.

An endemic South African genus with one species extending to Southern Rhodesia. Flowering period lasting usually not more than three or four weeks, in spring or early summer.

Description of the Species. The interpretation of the descriptions and the use of the key to the species will be facilitated if the following points are kept in mind:—

1. Leaves and bracts may vary somewhat in size and form even on the same plant. Leaves on growth shoots are usually much longer than those on the short lateral twigs but not wider in proportion. Below the inflorescences the leaves are frequently more or less transitional in form, sometimes for a considerable distance. The bracts commonly vary in one and the same inflorescence, those near the base being less dilated and more like the leaves, while if the typical bracts have a leaf-like point this may be very short or almost obsolete in the uppermost ones.
2. The hairy covering of the young stem varies somewhat with habitat and season, though less than Meisner supposed. The general habit and size of the plants may also vary considerably. Plants growing in sheltered situations have laxer branches or may even assume a weeping habit.
3. The bracts are usually lined within at the tip and variably along the middle by woolly hairs like those in the leaf-

grooves, while at the base a tuft of hairs surrounds the ovary. But the lateral expanded portions of the bracts are glabrous in some species, variously hairy in others: these parts are referred to as the *wings*.

The characters of the bracts have proved of most general service in distinguishing the species. In certain cases the anatomy of the leaves has afforded valuable confirmatory evidence.

ARTIFICIAL KEY TO SPECIES.

- Inflorescence terminal, subcapitulate, with about four flowers - - - - 1. **montana.**
- Inflorescence spicate, subterminal, usually left behind ultimately, at least on some of the leading branches, by further vegetative growth:
  - Outer sepals bearded behind the apex:
    - Leaves and bracts more or less hairy on the back - - - - - 8. **comosa.**
    - Leaves and bracts glabrous on the back or merely bearded at the apex:
      - Bracts with membranous glabrous wings:
        - Leaves narrow, linear or slightly tapering - - - - 9. **filiformis.**
        - Leaves broader, linear-lanceolate to ovate - - - - 11. **paludosa.**
      - Bracts comose within:
        - Bracts smooth, like the leaves but larger - - - - 4. **Burchellii.**
        - Bracts ovate, finely ribbed, apex sub-truncate - - - - 5. **rubra.**
  - Outer sepals not bearded:
    - Bracts with broad rounded glabrous membranous wings - - - 10. **Galpini.**
    - Bracts hairy all over within:
      - Leaves mostly more than 4 mm. long:
        - Leaves falcate; bracts large, ovate-acuminate, veined; tube long exserted - - - - 7. **falcifolia.**
        - Leaves linear, rounded at the apex; bracts little expanded, shorter than the leaves; tube short - - - - - 6. **obtusifolia.**
        - Leaves linear; bracts ovate-acuminate, with 7–13 close parallel folds, closely woolly within - - - - - 12. **vulgaris.**

Leaves linear, slightly wider at the base; bracts ovate, finely ribbed, apex subtruncate, comose within and fringed with hairs - - - - 5. **rubra.**

Leaves mostly less than 4 mm. long :

Leaves truncate or humpbacked in profile at the apex; bracts obtuse, ribbed and reticulately veined - - - - 2. **glomerata.**

Leaves not truncate :

Bracts leaf-like, smooth ; tube subrotund, pericarp succulent - - - - 15. **ericoides.**

Bracts broad, with short point and few shallow folds obsolescent towards the base ; tube flask-shaped, pubescent; pericarp subsucculent - 14. **rigida.**

Bracts obtuse, smooth; flower small, glabrous or nearly so ; tube short, not dilated below - - - 13. **paleacea.**

Bracts rhombic, smooth on the back but lateral margins sub-membranous and veined 3. **pendula.**

1. **Passerina montana** *Thod.* sp. nov. ; capitulis terminalibus, bracteis erectis submembranaceis coloratis distincta. — *P. ericoides* C.H. Wright in Fl. Cap. v. ii. p. 12, partly, not of Linn. *P. corymbosa* C. H. Wright ibid. p. 14, partly.

Young stems closely tomentose or pubescent. *Leaves* small and narrow, slightly diverging or appressed, ovate to linear, wider at the base, 1½ to 4 mm. long, rarely longer on the leading branches ; convex and glabrous on the back, at the apex often laterally compressed and angled. *Inflorescences* strictly terminal, capitulate, of four large bracts subtending four flowers, with or without smaller barren bracts below them, rarely with additional younger flowers below the four principal ones or only two. Axis short, woolly after fruiting. Principal bracts erect, longer than the leaves, 4–5 mm. long, rarely shorter or longer, ovate to obovate, often keeled and subacute, usually thin and coloured, longitudinally veined ; comose within, glabrous on the back. *Receptacle* tube 4–5 mm. long, rarely shorter, softly hairy within ; base slightly dilated, glabrous or nearly so, persistent, ultimately splitting off the fruit ; neck about half as long, pubescent, circumscissile above the fruit. *Sepals* 2–3 mm. long, scantily pubescent on the upper side, glabrous below ; outer concave, inner obovate or oblong.

Anthers oblong, about 1 mm. long. *Ovary* rather narrow, often hairy below the insertion of the style. *Fruit* dry.

A spreading shrub, up to 4 or 5 feet high, with numerous short leafy twigs, growing at altitudes from 3000 to 10,000 feet above sea level on the mountain ranges of the Great Escarpment from the Eastern Cape Province to Southern Rhodesia.

CAPE PROVINCE. King Williamstown Div.: Pirie, 3000 ft., *Sim* 68; Mts., 6000 ft., *Rattray* 382. Cathcart Div.: Fairford, Cathcart, *Miss D. Cotterell* 41. Queenstown Div.: Andriesberg, near Bailey, among rocks near summit, 6400–6800 ft., *Galpin* 2028. Wodehouse Div.: Indwe, 4500 ft. [Stormbergen], *Sim* 2595. Molteno Div.: Broughton near Molteno, 6300 ft., *Flanagan* 1635. Albert Div.: *Cooper* 625. Barkly East Div.: Drakensberg, summit of Doodman's Kranz Mt., 9650 ft., *Galpin* 6825; Wittebergen, *Mrs. F. W. Barber* 745. Herschel Div.: Majuba Nek near Sterkspruit, *Hepburn* 85.

BASUTOLAND. Leribe, Mtn. slopes 5–6000 ft., *Dieterlen* 49; Thabana-Morena, slope above mission station, *Dieterlen* 1247; Mequalling, *T. Cooper* 702; Mathatha, 9000 ft., *Hon. J. Bryce*; without precise locality, *E. Wager in Herb. Transvaal Mus.* 10772, *T. Cooper* 2302.

NATAL. Near Mooi River, 4–5000 ft., *J. M. Wood* 1523, 4036; Near Hoffenthal, Little Tugela Distr., 4000 ft., *J. M. Wood* 3464; van Reenen, 5500 ft., *J. M. Wood* 6601, 11405, 12179, *Bews* 42, *M. Franks in Natal Herb.* 14144; Bushmans Pass, 5–6000 ft., *J. Thode in Natal Herb.* 11418; Goodoo Pass near Mont-aux-Sources, *Sim*; Giants Castle, 10,000 ft., *R. E. Symons* 144; in Movelo Hills, 7000 ft., *Sutherland*; Klip River, 3500–4500 ft., *Sutherland*.

ORANGE FREE STATE. Harrismith, *H. J. Sankey* 69; Ladybrand, *Rogers* 2956, 788; Witzie's Hoek [Roode Bergen], *Junod in Herb. Transvaal Mus.* 17326; without precise locality, *Cooper* 842.

TRANSVAAL. Carolina, *Moss and Rogers* 1263; Barberton, *J. Thorncroft* 917; Barberton, Kaapsche Hoop, *Rogers* 21090; Sabie, Lydenburg Div., *Rogers* 23717, 23675; The Downs, Pietersburg Distr. [Mts. W. of Leydsdorp], *Rogers* 21919.

S. RHODESIA. Odzani River Valley, Manica Distr., Umtali Div., *A. J. Teague* 312.

This species has been called by S. African field botanists fairly consistently *P. ericoides*. It is probably the one referred to under that name by Sim in his " Forests and Forest Flora of Cape Colony ".

2. **P. glomerata** *Thunberg* Prodr. Pl. Cap. p. 75 (1794).—*P. glomerata* α Thunberg MS. in Herb. propr., not β or γ. *P. rigida* var. *truncata* Meisner (*Drège* 2971 in Herb. Kew. ex Berlin Herb.). One of Drège's specimens in Herb. Kew. named by Meisner *P. rigida* β *tetragona* is probably a young plant of this species.

Young stems shortly pubescent. *Leaves* small, 2–4 mm. long, mostly imbricate, four-ranked, slightly diverging at the apex; wider at the base, laterally compressed and keeled at the apex, truncate in profile or humped on the back. *Inflorescences* terminal or ultimately left behind by further growth on the principal branches, dense and few-flowered. *Bracts* 3–4 mm. long, ovate to broadly obovate, concave, obtuse, rather thick, truncate in profile at the apex, keeled and reticulately ribbed on the back, thickly woolly within. *Receptacle* tube about 4 mm. long, hairy within; base inflated, pubescent in the upper part, five-ribbed, at first persisting round the fruit, later splitting off; neck pubescent, exserted, constricted, bent and ultimately circumscissile above the ovary. *Sepals* about 2½ mm. long, scantily pubescent on the upper side, glabrous below; outer boat-shaped, inner elliptical or obovate-elliptical. *Anthers* oblong, 1 mm. long. *Fruit* dry.

A shrub, 3–5 feet or more in height, with ascending branches, leafy and much branched above. Western South Africa, extending from the neighbourhood of Tulbagh northwards to the Khamiesberg and Vogel Klip in Little Namaqualand and eastward beyond Matjesfontein on the Karroo.

Easily distinguished as a rule by the small four-ranked leaves, very truncate or hump-backed in profile, and the rather thick blunt bracts usually with three longitudinal ribs and more or less prominent reticulation between. In habit it resembles *P. vulgaris* but with a rounded, rather than plume-like, grouping of the foliage.

Young plants from the Western Karroo near Matjesfontein and elsewhere have the leaves not conspicuously truncate, though leaves approaching the typical truncate form can usually be found here and there.

The cells of the outer epidermis of the leaves have mucilaginous inner walls. The hump at the back of the leaf apex is formed by a short knot of fibres which behave like the wandering fibres described for other species but within narrow limits (see below under 12, *P. vulgaris*).

Cape Province. Tulbagh Div.: Tulbagh, *Pappe, Marloth* 4238, *Rogers* 17368; near Tulbagh waterfall, *Zeyher* 43; mountains near Saron, 3000 ft., *M. Schlechter* 1799, 10660; hills near Saron, 1000 ft., *M. Schlechter* 10627; fields, Piquetberg Rd. [now Porterville Rd. Sta.], *W. Tyson* 2318; sandstone outcrops, Vogel Vlei, *Compton.* Worcester Div.: summit of Tafelberg, at head of Hex River Pass, *Pillans*; summit of kopje behind Osplaats Sta., Hex River Pass, *Thoday*; Touws River, kopjes, *Thoday* 85; Tweeside flats, 1050 m., *Marloth* 10798. Laingsburg Div.: near base of Witteberg S. of Matjesfontein, *Thoday*; Whitehill near Matjesfontein, *Thoday* 213. Ceres Div.: Ravine, Matroosberg, near Laaken Vlei, 3500 ft., *E. P. Phillips* 2057; Farm Driefontein, Cold Bokkeveld, 1100 m., *Marloth* 10668. Piquetberg Div.: Piquetberg, *G.*

Edwards in Herb. Bolus. 14412. Clanwilliam Div.: Ezelsbank, 4–5000 ft. [Cederbergen], *Drège ;* Clanwilliam, *Union Dept. of Agric. Govt. Herb.* 11538 ; Graafwater, *Compton* ; Claypan, *Compton.* Little Namaqualand : Leliefontein, 4000–5000 ft., *Drège ;* near Spektakel, 3000 ft., *Bolus* 9507 ; Reitkloof Mtn., *Pearson* 5709 ; Zuurberg (Anegas), *Pearson* 6256 ; Khamiesberg, hills above Twee Rivieren, *Pearson* 6773 ; Vogel Klip, *Pearson and Pillans* 5928. Locality not precisely given : Tafelberg, C.P., *Kassner in Herb. Transvaal Mus.* 12850.

A specimen collected by Mr. Stokoe as far south as the Groot Drakenstein Mts. (near French Hoek) probably belongs here, though only the earliest traces of a few inflorescences were present and the majority of the leaves were hardly truncate.

3. **P. pendula** *Ecklon & Zeyher* ex Meisn. in DC. Prodr. xiv. 563 ; species adhuc non descripta, aspectu *P. rigidae* similis sed spicis saepe elongatis, bracteis rhomboideis extus convexis marginibus lateralibus fulvis scariosis sulcatis ciliatis differt. —*P. rigida* var. *comosa* Meisn. in DC. Prodr. xiv. 563 (partly).

Young stems thickly woolly. *Leaves* 2–3 mm. long, ovate-oblong to lanceolate, convex on the back or obtusely angled towards the apex, appressed. *Inflorescences* spicate, often elongated, at first terminal ; axes comose. *Bracts* rhombic, about 4 mm. long, smooth and convex on the back, veined towards the brown subscarious ciliate margins, comose within. *Receptacle* tube about 3½ mm. long ; base only slightly dilated, narrowly elliptical, nearly glabrous ; neck about half as long, pubescent without, slightly hairy within the throat. *Sepals* narrow, 3 mm. long, hairy on the upper side ; outer boat-shaped, inner oblong or oblanceolate. *Anthers* 1 mm. long or slightly longer.

I have not seen this species growing and adopt Ecklon and Zeyher's name for it without any implication as to its usual habit. Other species are sometimes pendulous in shade and shelter.

The species superficially resembles *P. rubra* in its inflorescences, and in vegetative characters some forms of *P. rigida.* It is distinguishable from both by the bracts, from the former also by the shorter wider leaves. The leaves differ anatomically from those of *P. rigida* in the absence of wandering hypodermal fibres.

Cape Province. Uniondale Div. : Longkloof, between Ongelegen and Misgund, 2700 ft., *Fourcade* 1708. Uitenhage Div.: Stony bed of Zwartkops River, *Zeyher* 44 ; Zwartkops R., *Zeyher* 7381 ; sandy places near Zwartkops R., *Zeyher* 1025. Port Elizabeth Div. : sandy ground in Krakakama, *Ecklon & Zeyher* 3780, 3781.

4. **Passerina Burchellii** *Thod.* sp. nov.; foliis latis apice barbatis, bracteis similibus intus comosis, sepalis extus apice barbatis, antheris parvis distincta. *P. rigida* var. *comosa* Meisn. in DC.

Prodr. xiv. 563, partly (ex MS. in Herb. Kew.). *P. tetragona* Burchell MS. in Herb. Kew. non Steud.

Young stems thickly whitish pubescent. *Leaves* 2–2½ mm. long, adpressed, ovate to obovate, concave, involute at the tip, smooth and convex on the back or at the apex obtusely angled, subacute, with a tuft of erect hairs behind the apex and shortly ciliate margin ; comose within. *Inflorescences* spicate, soon left behind by further vegetative growth. *Bracts* like the leaves but larger, thick, smooth and convex on the back, comose within, about 3 mm. long by 2 mm. wide. *Receptacle* tube 3 mm. long, little dilated, lanceolate, compressed, ribbed, scantily pubescent in the upper part, subglabrous below, hairy within, splitting off as a whole. *Sepals* about 2½ mm. long, slightly hairy above, hairy also on the under side near the tip ; outer boat-shaped, keeled, inner obovate. *Stamens* with small anthers and slender filaments ; filaments of the longer stamens longer than the sepals ; anthers elliptical, about ½ mm. long.

Apparently a dwarf species less than a foot high growing in crevices of rocks, with many erect branches arising from a woody base ; but this habit may be partly the result of veld fires, as some of the specimens are obviously charred at the base. Only known from one locality.

The stamens and the bearded sepals and leaves distinguish this species from both *P. rigida* and *P. pendula*.

South Western Cape Province. Caledon Div.: Mountain tops of Baviaans Kloof near Genadendal (collected in 1815), *Burchell* 7761 ; mountain summit near Genadendal c. 4900 ft. (collected in 1885), *Bolus in Herb. Norm.* 687.

5. **P. rubra** *C. H. Wright* in Fl. Cap. v. ii. p. 12.—*P. filiformis* var. *squarrosa* Meisn. in DC. Prodr. xiv. p. 562 (*Zeyher* 3779 ! I have not seen *Ecklon* 598).

Young stems closely woolly. Internodes on leading branches sometimes longer than the leaves. *Leaves* 3–6 mm. long, rarely longer, appressed or slightly spreading, a little wider at the base, at the apex laterally compressed, shortly keeled, obtuse and sometimes bearing a few hairs. *Inflorescences* spicate, often very long and lax with many flowers, vegetative growth ultimately resumed beyond them ; axis thickly comose, the wool sometimes protruding conspicuously between the bracts. *Bracts* usually somewhat spreading and rendering the inflorescences squarrose, 3–4 mm. long, ovate-acuminate, with short blunt point often subtruncate in profile, strongly but finely ribbed, comose within, margin with persistent fringe of long hairs. *Receptacle* tube about 3 mm. long, glabrous within ; base dilated but narrow, glabrous, ribbed ; neck slender, rather shorter than the base, pubescent just below the sepals, otherwise glabrous or nearly so, circumscissile above the fruit. *Sepals* about 2 mm. long, outer concave or boat-shaped, with a few long hairs behind the apex (sometimes wanting), inner elliptical or obovate-oblong, scantily pubescent above. *Anthers* ovate or oblong, $\frac{2}{3}$ to 1 mm. long, rather narrow.

I have not seen this species growing, and have no information as to its habit or height.

Cape Province. Riversdale Div.: Muiskraal near Garcias Pass, 1200 ft., *Galpin* 4492. Uniondale Div.: Keurbooms River, Longkloof, 2000 ft., *Fourcade* 1646. Port Elizabeth and Uitenhage Divs: Uitenhage Div., *Zeyher* 156; Uitenhage Distr., *Miss Macdonald* 4; Redhouse, *Mrs. T. V. Paterson* 833; Aloes, *T. L. Drège*; Bethelsdorp, *Mrs. T. V. Paterson* 270; hill sides near Port Elizabeth, 300 ft., *Bolus* 1905; slopes around Port Elizabeth, 200 ft., *Tyson* 2178; calcareous soil near Cradocktown, Algoa Bay, E. side of Port Elizabeth, *Zeyher* 3779. Albany Div.: West Hill near Grahamstown, *Bennie*; Brak Kloof [11 m. N.W. of Grahamstown], *Mrs. G. White* 1063.

Some of *MacOwan's* specimens numbered 103 belong here, the locality being given either 'Mts. near Howisons Poort 2000 ft.' or 'Hills near Grahamstown 2000 ft.', Albany Div.

6. **Passerina obtusifolia** *Thod.* sp. nov.; foliis patentibus linearibus apice rotundatis, spicis densis, bracteis apice foliis similibus basi parum dilatatis sulcatis distincta.

Young stems shortly tomentose. *Leaves* spreading, 4–8 or rarely up to 12 mm. long, strictly linear, straight or incurved or sometimes slightly recurved, with blunt rounded apex which bears while very young, in the bud, a tuft of short erect hairs. *Inflorescences* spicate, dense, terminal, some of the branches resuming vegetative growth after flowering. *Bracts* shorter than the leaves, with leaf-like tip and little dilated base having one or two, rarely three, prominent ribs on each side, hirsute within. *Receptacle* tube short; base dilated, nearly glabrous, about 2 mm. long; neck about half as long, loosely pubescent, bent outwards at the top, glabrous or hairy within. *Sepals* rather narrow, hairy on the upper side; inner obovate-oblong. *Anthers* narrow, ovoid, 1–1$\frac{1}{2}$ mm. long.

A shrub, 1 to 4 or 5 feet high, with several fairly stout stems bare below and branching profusely above as in *P. vulgaris*; but the stout, blunt, linear, spreading leaves are distinctive.

Cape Province. Clanwilliam Div.: Claypan Sta., *Compton*; Worcester Div.: Hex River Pass, Orchard Siding, 1400 ft., *Rogers* 16701; de Doorns, *Thoday* 86–91; between Osplaats and Tunnel Sidings, 2–3000 ft., *Rogers* 16703, 16705. Montagu Div.: mountain slopes near Montagu [Langebergen], *Miss Page*, *Thoday*. Laingsburg Div.: Witteberg near Whitehill and near Matjesfontein, *Thoday* 214; mountains round Seven Weeks Poort, *E. P. Phillips* 1503. Steytlerville Div.: De Hoek, Winterhoek Range, *Haughton*. Humansdorp Div.: Groot Hoek, Zitzikama, 700 ft., *Fourcade* 741. Port Elizabeth Div.: Port Elizabeth, *Florence Paterson* 833. Uitenhage Div.: Zwartkops River, Uitenhage, *Pappe*. Albany Div.: Alicedale, *Marloth* 4273; Mts. near Howisons Poort, *MacOwan* 103 (part), *Atherstone*; Grahamstown, *Rogers* 2235; stony ridges, Grahamstown, Hounslow Farm, and Niemands Poort near Grahamstown, *Galpin* 178; Zwartwater Poort, *Burchell* 3419; Highlands, *Daly* and *Sole* 297.

7. **P. falcifolia** *C. H. Wright* in Fl. Cap. v. ii. p. 10.—*P. filiformis* var. *divaricata* Wikstr. in Vet. Acad. Handl. Stockh. 1818, 325, and MS. in Herb. Thunb. *P. filiformis* var. *falcifolia* Meisn. in Linnaea xiv. 399 and DC. Prodr. xiv. 562 (? partly).

Young stems thickly pubescent. *Leaves* 6–10 mm. or sometimes up to 15 mm. long, spreading, falcate, gradually tapering in profile from base to apex, angled on the back and bearing at least when young a single median row of hairs each bent upwards at the base. *Inflorescences* spicate, at first terminal on the ultimate branches, but vegetative growth resumed beyond them. *Bracts* about 6 mm. long and 3–4 mm. wide (uppermost shorter), more or less spreading, ovate-acuminate with leaf-like tip, wings prominently veined, closely woolly all over within. *Receptacle* tube 5–6 mm. long, finely pilose within; base dilated, compressed, pubescent, persistent; neck slender, exserted, white woolly-pubescent, constricted and ultimately circumscissile above the fruit. *Sepals* glabrous on the lower side, pubescent on the upper side, 3 mm. long, elliptical, outer ones concave. *Anthers* narrow, ovoid, $1\frac{1}{3}$ mm. long. *Fruit* dry.

A shrub or small tree, reaching in sheltered situations on the margins of forests a height of 15 to 20 ft., of light and graceful habit, with slender pendulous ultimate branches. Outside the forest it sometimes assumes a more sturdy habit as a shrub up to 6 or 7 feet high with erect branches and less spreading leaves which are often scabrid with the stouter prominent bases of the hairs along the back. Apparently confined to the forest region of the Outeniqua and Zitzikama Ranges.

This species is superficially very like some forms of *P. filiformis*, but bracts, flowers and leaves differ by characters which make it difficult to regard the two even as closely allied.

Cape Province. Mossel Bay Div.: Ruyterbosch, Mossel Bay, *Miss L. Britten* 130. George Div.: Mts., *Mund*; near George, Montagu Pass, and between George and the Wilderness, *Thoday* 92–97; Wolfdrift, Malgaten River, *Burchell* 6109. Knysna Div.: Knysna, *Rogers* 27004; wood sides, Plettenberg Bay and the Knysna, *Bowie* 5; Blaauw Kranz, Knysna, *W. Tyson* 1449. Humansdorp Div.: [?] Ratels Bosch, the Zitzikama, 650 ft., *Fourcade* 74; Diep R. valley near Humansdorp, *Bolus* 2440 (part). Uitenhage Div.: stony channel of Zwartkops River, *Zeyher* 277; Vanstaadesberg, stony places, 1000–3000 ft., near Uitenhage, *Drège*.

8. **P. comosa** *C. H. Wright* in Fl. Cap. v. ii. p. 11.—*P. filiformis*

var. *comosa* Meisn. in DC. Prodr. xiv. p. 562. *P. falciformis Drège*, Zwei Pfl. Documente p. 208.

Young stems closely woolly or pubescent. *Leaves* up to 7 mm. long or rarely longer on the leading branches, more or less spreading, linear, hairy on the back towards the apex at least when young, the older ones sometimes rugose or warty with the bases of fallen hairs. *Inflorescences* spicate, vegetative growth ultimately resumed beyond them. *Bracts* broadly ovate, hairy without or more or less glabrescent towards the base, wings submembranous and glabrous within towards the margins. *Receptacle* tube about 4 mm. long, glabrous within; base dilated, shortly puberulent, persistent; neck pubescent, circumscissile above the ovary. *Sepals* 2–2½ mm. long, glabrous on the upper side, hairy at the tip on the lower side; outer broadly elliptical, concave, inner elliptical or obovate. *Anthers* about ⅔ mm. long, broadly ovoid or elliptical.

A small shrub similar in habit to *P. filiformis* and probably closely allied to it, but differing in the smaller more or less hairy leaves and the hairy ovate bracts not produced into a leaf-like point. Near Concordia, at the Western end of the Little Karroo, it reached a height of not more than 2 feet. The specimens, like those from other southerly localities, were softly and not so conspicuously hairy as the type specimens collected by Drège in Little Namaqualand, which appear to represent an extreme form. *Marloth* 10817 is a sturdy form with numerous dilated imbricate transitional leaves below the fertile bracts.

CAPE PROVINCE. Montagu Div.: near Concordia, *Thoday* 212. Worcester Div.: Tafelberg, 3000 ft., Hex R. Valley, *Pillans in Herb. Bolus.* 17159. Laingsburg Div.: quartzite mtn., Tweeside, 15 miles W. of Matjesfontein, 1300 m., *Marloth* 10817. Sutherland Div.: Farm Uitkyk, Roggeveld, 1450 m., *Marloth* 9695. Little Namaqualand: between Pedros Kloof and Leliefontein, 3–4000 ft., Khamiesberg Range, *Drège* 2570.

9. **P. filiformis** Linn. Sp. Pl. ed. i. 559; MS. in Herb. Linn. Descr. Linn. addenda; foliis et sepalis exterioribus apice barbatis, bractearum alis membranaceis glabris.

I include here a cultivated specimen from Gay's herbarium (now at Kew) labelled "Ex tepidariis Celsianis dedit Hardy, October 1816," which Mr. N. E. Brown identified in 1903 with specimens from the Berlin Herbarium named *Passerina cupressina* Wendl. Hort. and *Passerina pectinata* Hort., which he found to be identical. The latter name appeared in Loddiges' Catalogue, 1816, p. 18, and Meisner in Linnaea, xiv. p. 404 (1840) quotes it among the species unknown to him as "Bartl. MSS." In the same place he also mentions "*P. cupressina* Wendl. Hort."

Young stems pubescent. *Leaves* 4–15 mm. long, more or less spreading, straight or incurved, narrow linear or slightly tapering in profile or those below the inflorescences widening towards the base; at the apex bearing a more or less persistent tuft of erect hairs. *Inflorescences* spicate, at first terminal but vegetative growth often resumed beyond them even before the flowers open. *Bracts* 4–10 mm. long with leaf-like tip and membranous wings; wings often abrupt, more or less obscurely veined and glabrous within. *Receptacle* tube 3–5 mm. long, glabrous within, pubescent without; base dilated, compressed, persistent; neck slender, sometimes exserted, circumscissile above the fruit. *Sepals* glabrous above, $2\frac{1}{2}$–3 mm. long; outer boat-shaped with long loose beard on the back behind the tip; inner obovate to broadly ovate, slightly concave, glabrous on the lower side or with a few hairs behind the inflexed tip. *Anthers* 1 mm. long, ovoid.

A species with a wide range and somewhat variable. In the Cape Peninsula it is a shrub up to 6 ft. high, of broadly rounded form with straight narrow linear spreading leaves, but in shade it assumes a lax habit with pendulous branches. The type specimen in Herb. Linn. agrees so closely with the Cape Peninsula form that there can be little doubt but that it was collected there.

In Natal Medley Wood described one specimen as a small tree (*Wood* 1182), and in the eastern part of its range the species appears to be generally more robust and luxuriant in its growth. All the parts tend to be larger, the membranous wings of the bracts more conspicuous and the leaves for some distance below the inflorescence more or less expanded towards the base. Some specimens with incurved tapering leaves, exserted receptacle tubes and veined bract wings bear a striking superficial resemblance to *P. falcifolia*, though they can be distinguished at once by the apical beard on leaves and outer sepals and by the glabrous inner side of the bract wings.

The specimens collected on sandy ground at Langeenheid, Malmesbury Div., differed from the Cape Peninsula form in being glutinous, so much so that the beard on the sepals was adherent and difficult to detect, also in a tendency to elongation of the inflorescence, in the ovate acuminate bracts narrowing gradually to the apex instead of having a distinctly leaf-like tip, and in the narrower leaves. I regard this as a distinct variety and propose to call it *P. filiformis* var. **glutinosa** *Thod.* Schlechter 5125 from sandy places farther north agrees with it closely, except for the glutinous character of which in the dried specimens no trace is left.

Cape Province. Clanwilliam Div.: sandy places near Alexanders Hoek, 3–400 ft., *Schlechter* 3439, 5125 (var. *glutinosa*). Malmesbury Div.: round Langeenheid Sta., *Thoday* 215 (var. *glutinosa*). Cape Peninsula: near Cape Town, *Burchell* 66, 276, *Bolus* 2925; W. side of Signal Hill, *F. Wilms* 3590; close to Signal Station, *Woolley Dod* 3103. Caledon Div.: Steenbras, *Rogers* 17835. Riversdale Div.: Great Valsch River, *Burchell* 6544. Mossel Bay Div.: Attacquas Kloof, *Gill*. Knysna Div.:

Redlands, *Keet in Forest Dept. Herb.* 3599. Humansdorp Div.: Diep R. valley, near Humansdorp, *Bolus* 2440 (partly).

TRANSKEI, ETC. Transkei: Qolora River bank, Kentani, 1000 ft., *Alice Pegler* 1273. Tembuland: Equtyeni, near All Saints, *R. Baur* 1162. Pondoland: banks of R. Umkwani, *W. Tyson* 2621. Griqualand East: sides of Mt. Ingeli, 6500 ft., *W. Tyson* 1287.

NATAL. *W. T. Gerrard* 1478. Durban Div.: hills above Pinetown, 2400 ft., and Botha's Hill, 2400 ft., *J. M. Wood*; Botha's, 2000 ft., *J. M. Wood* 3938; Inanda, *J. M. Wood* 1182. Polela Div.: high veld above Xalinquena, *Fernandez* 144. Weenan Div.: Table Mtn. [Drakensberg, NE. of Giants Castle, 6500 ft.], *Bews*.

10. **P. Galpini** *C. H. Wright* in Fl. Cap. v. ii. p. 10.

Young stems puberulent. *Leaves* thick, 4–6 mm. long, linear, obtuse, strongly incurved towards the apex, suberect but not appressed, convex and glabrous on the back, apex bearing in the bud a broad tuft of short hairs. *Inflorescences* dense, spicate, terminal or vegetative growth resumed beyond them. *Bracts* wide, with short leaf-like point and large rounded membranous wings glabrous within and faintly veined, up to 5 mm. long and broad. *Receptacle* tube about 3 mm. long, little dilated below, narrowing gradually to a very short neck, puberulent without, glabrous within. *Sepals* wide, glabrous, $2\frac{1}{2}$–3 mm. long; outer broadly elliptical, concave, inner obovate or subrotund. *Longer stamens* often longer than the sepals; anthers broadly ovoid, 1 mm. long.

Probably allied to *P. filiformis* from which it differs in the stouter obtuse incurved leaves, glabrous sepals and short-necked receptacle tube.

CAPE PROVINCE. Riversdale Div.: near Milkwoodfontein, 600 ft., *Galpin* 4491. Mossel Bay Div.: Mossel Bay, *Rogers* 26921.

Without locality, *G. Potts* 1017.

11. **Passerina paludosa** *Thod.* sp. nov.; affinis *P. filiformi*, sed foliis erectis latioribus, bracteis apice latioribus, florum tubis gracilioribus basi minoribus, differt.

Young stems more or less pubescent. *Leaves* erect, nearly straight, often appressed or imbricate, 3–8 mm. or rarely 10 mm. long, up to 2 mm. or more wide, the longer ones narrow lanceolate, the shorter lanceolate to ovate, convex or obtusely angled and glabrous on the back, with ciliate margin and apex often coloured, bearing a persistent tuft of white erect hairs. *Inflorescences* spicate, at first terminal, but vegetative growth quickly resumed beyond them. *Bracts* ovate, acuminate with a broad point like the leaves and faintly veined membranous wings glabrous within. *Receptacle* about 4 mm. long, pubescent without, glabrous within, the neck slender, longer than the small dilated base, circumscissile above the fruit. *Sepals* about 3 mm. long; outer boat-shaped with a tuft of hairs behind the apex, inner obovate, glabrous. *Anthers* ovoid, $\frac{2}{3}$–1 mm. long.

A shrub with few rather lax terete stems, bare below, branched and leafy above, occasionally reaching 10 feet in height, but generally not exceeding 3–6 feet.

In many respects similar to *P. filiformis*, but strikingly different in habit and leaf.

CAPE PROVINCE. Cape Div.: vleis and marshy ground, Cape Flats, *Thoday* 100, &c.; Muizenberg Plateau, *E. Kensit.*

12. **Passerina vulgaris** *Thod.* sp. nov.; foliis erectis linearibus extus glabris obscure striatis, bracteis ovatis acuminatis in longitudine plicatis quasi striatis intus breviter lanatis, sepalis extus glabris, distincta.—*P. filiformis* var. *α vulgaris* Meisn. in DC. Prodr. xiv. 562. *P. corymbosa* Eckl. ex Meisn. l.c. (*Zeyher* s.n. in Herb. Kew.! E. & Z. n. 40, fide Meisner). *P. filiformis* C. H. Wright in Fl. Cap. v. ii. p. 10 (partly) not of Linn.

Young stems white pubescent, often with patent white tufts below the leaves. *Leaves* 2–10 mm. long, erect, sometimes appressed, more often diverging somewhat, linear, a little incurved and slightly tapering towards the apex, glabrous on the back, with three or more veins visible as faint striae when fresh. *Inflorescences* spicate, at first terminal but vegetative growth continuing beyond them; axes usually conspicuous after fruiting as white comose leafless intervals on the branches. *Bracts* 4–6 mm. long, ovate-acuminate, with leaf-like point, shorter or sometimes wanting in the upper ones, and 3 to 6 close parallel folds on each side, shortly woolly all over within, glabrous without. *Receptacle* tube about 4 mm. long; base inflated, compressed, puberulent in the upper third, glabrous below, for a time persisting round the fruit, ultimately often splitting off; neck whitish-pubescent, circumscissile above the fruit, slightly hairy within the throat or rarely quite glabrous within. *Sepals* about 3 mm. long, glabrous or on the upper side slightly puberulent; outer boat-shaped, inner obovate, slightly concave. *Anthers* ovoid, 1 mm. long. *Pericarp* fleshy at the side below the style, elsewhere thin and membranous.

A shrub with slender erect terete usually reddish stems up to 6 or 8 or sometimes 10 or 11 feet high, bare below, much branched and leafy above, the branches ascending, subfastigiate, or in sheltered situations somewhat pendulous.

This is by far the commonest species. It is readily distinguished from other species by the bracts, the close parallel folds reduplicating the structure of the grooved leaf. The wandering hypodermal fibres present in the leaves(¹) are only

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(¹) Thoday, Annals of Botany, 35, 1921, p. 585, where the species is referred to as *P. filiformis.*

found similarly developed in two other species, *P. rigida* and *P. paleacea* (but see also under 2, *P. glomerata*).

Cape Province. Malmesbury Div.: low kopjes near Langebaan, Saldanha Bay, *E. L. Stephens*; Hopefield, *Thoday.* Cape Peninsula: near Cape Town, *Burchell* 473, 66 (part), *Marloth* 1585, 2756; near Newlands, *Zeyher* 3782; Muizenberg, *Caporn in Herb. Guthr.*; Kalk Bay, on mountain, 100–600 ft., *G. Potts* 2294; Simons Bay, *C. Wright*; sandy shore, Camps Bay, *Moss* 3237. Cape Div.: Belleville, on sand, *Rogers* 17281. Stellenbosch Div.: Stellenbosch, *G. Potts* 1402; French Hoek, between Kriels and foot of Pass, 1000 ft., *Phillips* 1294; Jonkers Hoek, *N. S. Pillans in Herb. Bolus* 15416. Paarl Div. Mtn., Paarl, 800 ft., *Bolus* 2924. Tulbagh Div.: Tulbagh Valley, *Zeyher* 43 (part). Ceres Div.: top of Michell's Pass, 500 m., *Marloth* 10693; Ceres, *Miss Guthrie.* Worcester Div.: near Goudini Rd. and Breede R. Stations, *Thoday.* Montagu Div.: Cogmans Kloof, 280 m., *O. Kuntze.* Caledon Div.: Steenbras, *Rogers* 17835; Kogel Bay, *M. R. Mitchell*; Hermanus, *M. de Beer in Herb. Transvaal Mus.* 16536, *Rogers* 26574; Mossel River, *G. Potts* 1617; slopes at Bot. R. Sta., margins of streams at Elgin, and (rare) Waterkloof, Caledon, *Pillans.* Swellendam Div.: Swellendam, *Zeyher*; 1000–4000 ft., *Ecklon and Zeyher*; 1200–2000 ft. *Burke* 45. Riversdale Div.: Albertinia, *Dr. J. Muir* 683; hills near Zoetemelks R., *Burchell* 6781. Mossel Bay Div.: between Great and Little Brak Rivers, *Burchell* 6163; Cloetes Pass, *Dr. J. Muir* 2401; Mossel Bay, *Rogers* 26920. Knysna Div.: scrub at base of Knysna Heads, *Schönland* 3398–3525; Buffalo Bay, Kynsna, *Keet* 851; Keurboom River Hill, 600 ft., *Fourcade* 1478, 1479; Formosa, Plettenberg Bay, 200 ft., *Fourcade* 1484. Port Elizabeth Div.: Port Elizabeth, *I. L. Drège in Herb. Transvaal Mus.* 10800; drift sands, *Sim*, 20; German School, *I. L. Drège* 285. Uitenhage Div.: Redhouse, *Paterson* 833. Albany Div.: Grahamstown, *Breijer in Herb. Transvaal Mus.* 16898; 1850 ft., *Rogers* 1564; Hope's Garden Hill, Grahamstown, *Galpin* 251; Signal Hill, Grahamstown, on Witteberg Sandstones, *Britten* 2811, 2812; stony slopes near Grahamstown, 2200 ft., *MacOwan* 103 (part); Highlands, *Daly and Sole* 297; Coldspring, *J. Glass* 178. Bathurst Div.: Port Alfred, *Schönland* 302; near Port Alfred, *Burchell* 3835, 3950. King Williamstown Div.: Mt. Coke, 1000 ft., by river, *Sim* 2234; Mt. Coke, 100 ft., *Sim* 1499 (= *Sim* 1380); Woolf River Plateau, Amatola Range, 4500 ft., *F. J. Stayner* 24. East London Div.: East London, *Breijer in Herb. Transvaal Mus.* 16577. Queenstown Div.: beside streamlet on Junction Farm, Gwatigu, 2500 ft., *Galpin* 8279. Graaff Reinet Div.: Mtn. summit, Oudeberg, near Graaff Reinet, 5000 ft., and sides of Sneeuwberg Mts., 5000–7500 ft., *Bolus* 170.

Natal. District Alexandra, Station Dumisa, 700 m. rock-kranzes [?] Emsdale, *H. Rudatis* 1204.

Whether Meisner included also the true *P. filiformis* Linn.

under his var. α I cannot say, as I have not seen all the specimens he quotes. *Burchell* 66 in Herb. Kew. includes specimens of both.

I have not seen *E. & Z.* 40 which is quoted by Meisner in support of the synonymy of Ecklon's name with his *P. filiformis* var. α *vulgaris*. I infer, however, from Zeyher's specimen in Herb. Kew. and *Bolus* 170, which was identified by Professor D. Oliver as *P. corymbosa* Eckl., that Ecklon applied the name to an extreme form of this species. The name does not fit the common form. Wright in Flor. Cap. has applied it to a mixed group of specimens belonging to several species, apparently on the basis of the subcorymbose character of the inflorescences. In order to avoid confusion I reject Ecklon's *nomen nudum* and adopt Meisner's varietal name as eminently fitting the commonest species of the genus.

13. **P. paleacea** *Wikstrom* in Vet. Acad. Handl. Stockh. 1818, 323 and MS. in Herb. Thunb.—*Lachnaea paleacea* Herb. Banks. fide Wikstrom, loc. cit. *Passerina glomerata* α Thunberg MS. in Herb. propr.

Young stems densely, often thickly woolly. *Leaves* small, imbricate, appressed, four-ranked, 2 mm. long or up to 4, rarely 6 mm., on the leading branches, wider at the base and convex on the back, laterally compressed at the apex, the median vein visible in the upper half and usually forming a distinct keel incurved at the apex; leaves below the inflorescences usually dilated. *Spikes* dense, oblong or subrotund, mostly terminal, a few left behind by further vegetative growth of leading branches. *Bracts* 3 mm. long or less, subrotund, concave, blunt, or sometimes with very short obtuse point, convex and smooth on the back or obtusely keeled at the apex, sometimes finely striate towards the upper margins, usually with narrow, thin and membranous, pale or coloured, ciliate edge. *Receptacle* tube short, included, hardly more than 2 mm. long, cylindrical, compressed, or ultimately the lower part dilated round the fruit, glabrous or nearly so without, slightly hairy within in the upper part, splitting off as a whole or sometimes circumscissile above the fruit. *Sepals* patent, close against the inflorescence, glabrous, thin and membranous; outer elliptical or subrotund, concave, about 2 mm. long, inner obovate, slightly longer. *Anthers* $\frac{2}{3}$ mm. long or less, cordate. *Fruit* dry.

A small shrub with ascending branches, growing on drift sand, usually 1–3 feet in height, occasionally up to 6 feet in the shelter of other shrubs, but near the sea dwarf and prostrate.

Very similar in leaf to *P. rigida* of which without the flowers it might be taken for a small form; but it differs in the small glabrous flowers, the smooth thin blunt bracts and the dry fruit.

Wandering hypodermal fibres (cf. *P. vulgaris* and *P. rigida*) are present in the distal half of the leaves, reinforcing the median bundle, so forming the keel, and spreading for a short distance laterally from it in large numbers.

Cape Province. Cape Div.: Blaauwberg Strand, *Tredgold*; Cape Flats, *Burchell* 8389, *Thoday* 25 etc.; Belleville, *Rogers* 16358; Raapenburg, *Guthrie* 1039; sandy places near Wynberg, *Bolus* 2926; sandy flats near Muizenberg, *Thoday* 74, 62; Kalk Bay, *Rogers* 16082; dry dunes, Fish Hoek, *C. E. Moss* 3236; Simons Bay, *C. Wright*; shore beyond Simonstown, *Wolley Dod* 2927; sand hills N.W. of Simonstown, *Pillans* 3783; Karbonkelberg and Little Lion's Head, *Thoday* 76; Kommetje (Slangkop Pt.), *Thoday* 67. Stellenbosch Div.: Bottelary, *L. Bolus in Herb. Bolus* 17197; drift sand between Somerset Strand and Gordons Bay, *Thoday* 24. Caledon Div.: Kogel Bay, fide *M. R. Mitchell*; Mossel River, *E. L. Stephens*; Hermanus, *M. R. Mitchell*.

One of Drège's specimens in Herb. Kew. belongs here. Meisner's identification is *P. ericoides* L. for which the locality given in Drège, Zwei Pfl. Documente is "Between Grosberg-rivier and Waterval, 2500–3000 ft." (van Rhyn's Dorp or Calvinia Div.). This is probably an error due to confusion with *P. glomerata*.

14. **P. rigida** *Wikstrom* in Vet. Acad. Handl. Stockh. 1818, 326 and MS. in Herb. Thunb.—*P. rigida* Meisn. in DC. Prodr. xiv. 563, and Linnaea xiv, 402, partly. *P. eriophora* Gandoger in Bull. Soc. Bot. France lv. 418 (1913). (The specimen quoted as *J. M. Wood* 1702 is apparently an error for *J. M. Wood* 1712. The description and locality also both indicate *P. rigida*.)

Young stems thickly tomentose or woolly. *Leaves* appressed, imbricate, four-ranked, 2–4 mm. long or rarely longer on the leading branches, narrow-lanceolate to ovate, convex on the back, wider at the base, laterally compressed towards the tip, the median vein usually visible in the upper half often as a blunt keel, sometimes also part of a lateral vein visible on each flank. *Inflorescences* short, spicate, terminal, often left behind ultimately by further growth on the leading branches, axes thickly comose after fruiting. *Bracts* thick, shortly acuminate, wide, with few shallow parallel furrows, usually obsolescent towards the base, or rarely smooth, closely woolly within. *Receptacle* tube 3–$3\frac{1}{2}$ mm. long, base inflated, ribbed, glabrous, ultimately splitting from the fruit, neck short, pubescent without, more or less pubescent within, circumscissile above the ovary. *Sepals* about $2\frac{1}{2}$ mm. long, usually rather narrow, glabrous on the lower, downy on the upper side; outer ones boat-shaped, inner obovate. *Anthers* oblong, about 1 mm. long. *Pericarp* inflated, yellow or orange, subsucculent, fruit round, 3 mm. long and wide.

A robust shrub up to 6ft. high or more, with stout erect stems, the branches bearing numerous short, straight, ascending or rarely lax leafy twigs, growing on sand dunes near the sea from False Bay eastwards to Natal.

This species is sturdier than *P. vulgaris*, with stouter stems, though somewhat similar in habit. It differs from it also in the fleshy coloured fruit, the leaves distinctly wider towards the base, the wider bracts with fewer shallower folds and in the woolliness of the young stems. Leaves and twigs are very like those of *P. paleacea* but larger and more robust.

Wandering fibres reinforce the median veins as in *P. paleacea* and *P. vulgaris*. They also wander hypodermally between it and the lateral veins rather loosely, much as in *P. vulgaris*, and the two principal lateral veins are reinforced.

CAPE PROVINCE. Cape Div.: floating dunes near Muizenberg, *Thoday* 59,64, 70. Caledon Div.: Kogel Bay (False Bay), *M. R. Mitchell*. Mossel Bay Div.: fore dunes and drift sand E. of Mossel Bay, *Thoday*. George Div.: fore dunes at 'The Wilderness', *Thoday*. Knysna Div.: Knysna, *Duthie* 533; Buffalo Bay, Knysna, *Keet* 873; Plettenberg's Bay, *Leipoldt in Herb. Bolus* 17084. Port Elizabeth Div.: Port Elizabeth, *W. Kemsley* 141; sand dunes and rocky shore, *Drège*; shore near Port Elizabeth, *Zeyher* 405; Humewood, *Paterson* 1123. Uitenhage Div.: Redhouse, *Paterson* 270; sand dunes, mouth of Coega R., *Zeyher* 3777. Bathurst Div.: Port Alfred, *Atherstone* 315, sand dunes, *Tyson in herb. Transvaal Mus.* 17233; between Kasuga [? Kariega] R. and Port Alfred, *Burchell* 4049. East London Div.: East London, *G. Rattray* 194, *Sim* 1471, *J. Wood in Herb. Galpin* 3363, *Mrs. G. Fouche*; sand dunes near beach, 100 ft., *G. Potts* 1835; soft sand about 100 yards from beach, *O. Hilner* 184. Komgha Div.: near Kei Mouth, sand hills, 200 ft., *Flanagan* 418.

TRANSKEI, ETC. Port St. Johns, shoreward side of dune scrub, *Moss* 3238; Dunes at Embotzi Mouth Distr. Lusikisiki, Pondoland, *O. B. Miller in Herb. Forest Dept.* 4410.

NATAL. Winkle Spruit, secondary dunes, *Rudatis* 1505; sand dunes, Isipingo, *Moss* 6001; near Durban (sea beach, and dunes up to 200 ft.), *J. M. Wood* 1712, 9139, *F. Wilms* 2277, *Moss* 6002, *Peddie*, *O. Kuntze*, *Sutherland*.

Locality not identified: Somerset, S. Africa, *Bowker*.

In addition to the above are three specimens recorded as from inland localities, viz. *Rogers* 1564, Grahamstown 1800 ft.; *T. Cooper* 2301, Howisons Poort, Albany Div.; and one without number or collector's name, but possibly one of *Ecklon and Zeyher's*, in *Herb. S. A. Mus.*, from mountains, Swellendam District. These exceptional localities seem to require confirmation, as all the other records are from sand dunes or sea shore. The first two, on the other hand, being both from the neighbourhood of Grahamstown, lend each other support. They agree with *P. rigida* not only in habit and in bract and flower characters, but also in leaf anatomy, wandering hypodermal fibres being present. Unfortunately there are no fruits.

15. **P. ericoides** *Linn.* Mant. 236 and MS. in Herb. Linn.—*Chymococca empetroides* Meisner in DC. Prodr. xiv. 565. *Passerina filiformis* var. *crassifolia* Eckl. & Zeyh. ex Meisn. l.c., nomen.

Young stems whitish-tomentose. *Leaves* 2–3 mm. long, oblong, obtuse, smooth and convex on the back. *Inflorescences* spicate, at first terminal, but vegetative growth usually resumed beyond them. *Bracts* like the leaves but slightly dilated at the base, smooth. *Receptacle* tube at first 2–3 mm. long, ovoid, with very short wide neck or none, but enlarging very early and becoming more or less rotund, pubescent without, hairy within at the throat and more scantily below, ultimately splitting and falling as a whole from the fruit. *Sepals* about 2 mm. long, subrotund or broadly obovate, concave, more or less pubescent on the upper side, glabrous on the lower. *Anthers* about 1 mm. long, subcordate. *Fruit* a round shining scarlet berry, 5–6 mm. in diameter.

A small shrub, 2–3 feet in height, with arcuate branches, growing on shifting dunes near the sea.

CAPE PROVINCE. Cape Div.: Blaauwberg Strand, crests of front dunes, fide *M. R. Mitchell*; "sands of Table Bay and S.E. Coast," *Bowie* 1; Zoutrivier [? Salt River near Capetown, ? *Pappe*] 42 *in Herb. S. A. Mus.*; sand dunes near Milnerton, *Thoday* 75; Camp Ground, Rondebosch, *M. M. Page*; Muizenberg, *Caporn*, sand hills, *F. Guthrie* 1437; Simons Bay, *C. Wright*; sandy shore of False Bay near Simonstown, *MacOwan* 3404; Lower North Battery, Simonstown, *Wolley Dod* 1878; dunes near Kommetje, *Thoday*. Caledon Div.: sand dunes, Mossel River, *E. L. Stephens*.

INCERTAE.

The following specimens constitute a small residuum of doubtful identity, representing perhaps either undescribed species inadequately, or forms of species already described from exceptional habitats or beyond the range at present recognised.

Burchell 7129, summit of Kampsche Berg, Riversdale Div.
Burchell 5929, Cradock Berg, near George.

These specimens come near to *P. comosa*.

Burchell 5929 has only very young inflorescences, the bracts of which are hairy on the back; but they are also hairy all over within and the leaves are not hairy nor even bearded. *Burchell* 7129 has bearded sepals, like *P. comosa*, but the receptacle tube is hairy within, the leaves are not hairy nor bearded at the apex even in the bud, while the bracts which are ovate with few shallow folds are hairy all over within and have at most a trace of hairiness on the back of the wings. Apart from the hairiness of the young bracts of *Burchell* 5929 the two specimens are very similar, with small narrow leaves about 3 mm. long, laterally compressed at the apex, and young stems thickly woolly.

Burchell 626, Table Mtn., Cape Peninsula.

This does not agree with any of the Cape Peninsula species. It was apparently not more than 6 inches high. The leaves are more or less recurved and blunt, the bracts rather like those of *Burchell* 7129, shaggy within, the receptacle tube hairy within the throat, the sepals not bearded, the anthers very narrow, almost linear.

Bowie 2, Summit of the Traduberg, Cape of Good Hope. [? Tradouw's Pass, Langebergen, between Swellendam and Heidelberg.]

Schlechter 5846, Montagu Pass, 4500 ft. [between George and Oudtshoorn].

These two specimens agree fairly closely. In many respects they also agree with *Burchell* 7129 and 5929. The sepals are all bearded, the outer ones conspicuously with long hairs. The receptacle tube is hairy within. The inflorescences at first sight resemble those of *P. montana* (cf. *Rogers* 2956), but they are not always strictly terminal and are distinctly spicate. In *Schlechter* 5846 (Herb. Bolus.) the wings of some bracts are distinctly hairy on the back (cf. *Burchell* 5929) and I have seen young leaves in the bud bearing a few hairs behind the apex.

Bolus 11630, Mountain summit, Zwarteberg Pass, 5300 ft., Prince Albert District [between Prince Albert and Oudtshoorn].

Stokoe in Herb. Bolus., Zonder Einda Mts. near boundary between Worcester, Robertson and Caledon Divs.

W. Tyson 77, River banks near Murraysburg, 4000 ft.

Of these three specimens, *Bolus* 11630 has the general appearance of rather stunted *P. obtusifolia*, but the leaves are not blunt, and the inflorescences differ markedly in the obovate or rhombic, reticulately ribbed bracts with a very short point, from which thick wool protrudes conspicuously. Stokoe's specimen is past the flowering period and the few bracts left are insufficient for identification. In leaf and habit it is rather like stunted *P. vulgaris*, but the leaves have no wandering fibres. *Tyson* 77 is very stunted in every part. Neither leaves nor sepals are bearded. The bracts are small, ribbed and wrinkled, the leaves short, thick and wrinkled. Without further material it is not possible to place it.

It is worthy of note that these specimens are mostly from mountain summits and outlying localities, where either local species or extreme forms might be expected. Only further collecting in these localities and in others linking them with the main area of distribution of the genus can solve the problems of their identification.

XIX.—ADDITIONS TO THE INDEX KEWENSIS: II.*

The present instalment includes the names of fifty-eight new Mexican species and five new combinations published in Contributions from the U.S. National Herbarium, vol. i, no. 9

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* Continued from *Kew Bull.* 1923, 128.

(1895). These should have appeared in the first Supplement to the Index Kewensis, but this number of the Contributions was somehow overlooked by the compilers, although the remainder of the volume was examined. It may be well to mention that, unlike the original Index and the remaining Supplements, which were compiled at the Kew Herbarium and published by the Clarendon Press, the first Supplement was undertaken as a private venture and published at Brussels, and that it was completed under great difficulties owing to the failing eyesight of one of the authors. References are now given also to the original description by Fournier and the redescription by Vasey of the genus *Gouinia* (*Gramineae*), and to the redescription by Rose of the genus *Agiabampoa* (*Compositae*). The publication of *Gouinia* offers some peculiar features. Fournier sent proofs of his enumeration of Mexican *Gramineae* to Bentham in 1881, and the latter (Gen. Plant. iii. 1178 ; 1883) based his account of *Gouinia*, which he had not seen, entirely on Fournier's description. But the publication of Fournier's memoir was delayed until 1886. Hence only Bentham's description was cited in the Index Kewensis, since that work did not include references of later date than 1885. Vasey's work on *Gouinia* was overlooked by another American agrostologist, Scribner, who in 1897 proposed the combinations *Gouinia mexicana* and *G. latifolia* (U.S. Dept. Agric., Div. Agrost., Bull. no. 4, 10) which had been published two years previously by Vasey.

The names given below will be included in the sixth Supplement to the Index Kewensis. In view of the large number of new species concerned, however, it seems desirable to publish the list forthwith, for the convenience of students of the Mexican and Central American floras.

Most of the species indexed below were collected in one of the following localities: Agiabampo (in the extreme south of Sonora), Manzanillo, Armeria and Colima (all in the State of Colima). Armeria is a small place halfway between Manzanillo and the city of Colima. Except in a few instances where complete citations are given, the pages cited are those of Contrib. U.S. Nat. Herb. vol. i. no. 9 (1895).

Abutilon bastardioides *E. G. Baker ex Rose*, 306.—Mexico (Colima).

Acalypha coryloides *Rose*, 357.—Mexico (Manzanillo).

Acalypha papillosa *Rose*, 358.—Mexico (Agiabampo).

Agiabampoa *Rose* (Compositae) ; Rose. 335, descr. ampl.

Agiabampoa congesta *Rose* ; Rose, 335, descr.—Mexico (Agiabampo).

Argithamnia manzanilloana *Rose*, 357.—Mexico (Manzanillo).

Ayenia manzanilloana *Rose*, 309.—Mexico (Manzanillo).

Brickellia colimae *Rose*, 333.—Mexico (Colima).

Bumelia arborescens *Rose*, 339.—Mexico (Colima).

Canavalia acuminata *Rose*, 322.—Mexico (Manzanillo).

Capparis Palmeri *Rose*, 301.—Mexico (Manzanillo).

Cardiospermum spinosum *Radlkofer*, 368.—Lower California (La Paz).

Cassia manzanilloana *Rose*, 325.—Mexico (Manzanillo).

Ceiba grandiflora *Rose*, 308.—Mexico (Manzanillo).

Celosia monosperma *Rose*, 352.—Mexico (Manzanillo).

Cienfuegosia Palmeri *Rose*, 308.—Mexico (Colima).

Crataeva Palmeri *Rose*, 301.—Mexico (Armeria).

Drymaria procumbens *Rose*, 304.—Mexico (Colima).

Encelia purpurea *Rose*, 336.—Mexico (Colima).

Euphorbia colimae *Rose*, 356.—Mexico (Colima).

Euphorbia sonorae *Rose*, 356.—Mexico (Agiabampo).

Flaveria robusta *Rose*, 337.—Mexico (Colima ; Armeria).

Forchhammeria Watsoni *Rose*, 302.—Mexico (Sonora ; Lower California).

Gaya minutiflora *Rose*, 305.—Mexico (Colima).

Gouinia *Fourn. ex Benth.* ; Fourn. Mex. Pl. Gram. 103 (1886) ; Vasey apud Rose, 364, descr. emend.

Gouinia latifolia *Vasey apud Rose*, 365 : Tricuspis latifolia.

Gouinia mexicana *Vasey apud Rose*, 365 : Leptochloa mexicana.

Gouinia polygama *Fourn.* Mex. Pl. Gram. 103 (1886) ; Vasey apud Rose, 365, descr. ampl.—Mexico (Vera Cruz ; Colima ; Guerrero ; Oaxaca). Recorded also from Yucatan (Millsp. in Publ. Field Columb. Mus., Bot., iii. 57 ; 1903).

Heteropteris Palmeri *Rose*, 311, in adnot.—Mexico (Alamos).

Hiraea mexicana *Rose*, 312.—Mexico (Armeria).

Ipomoea Nelsoni *Rose*, 343.—Mexico (Manzanillo ; Tuxtepec, Oaxaca).

Ipomoea Wolcottiana *Rose* ; Rose 343, descr.—Mexico (Manzanillo). The species was first published in Garden and Forest, vii. 367 (1894). As that periodical is not accessible to many botanists, it seems desirable to add the second reference.

Jacobinia auriculata *Rose*, 349.—Mexico (Colima).

Jatropha purpurea *Rose*, 357.—Mexico (Agiabampo).

Justicia mexicana *Rose*, 348.—Mexico (Agiabampo).

Justicia paniculata *Rose*, 348.—Mexico (Colima).

Karwinskia parvifolia *Rose*, 315.—Mexico (Agiabampo).

Krameria Palmeri *Rose*, 304.—Mexico (Agiabampo).

Leucaena macrocarpa *Rose*, 327.—Mexico (Jalisco).

Lonchocarpus Palmeri *Rose*, 322.—Mexico (Manzanillo).

Malpighia guadalajarensis *Rose*, 310, in adnot. : Bunchosia guadalajarensis.

Malpighia ovata *Rose*, 310.—Mexico (Manzanillo).

Malpighia umbellata *Rose*, 310.—Mexico (Agiabampo).

Malpighia Watsoni *Rose*, 310, in adnot. : Bunchosia parvifolia *S. Watson*. The specific name had to be changed on account of the previously published *Malpighia parvifolia* Juss. *M. Watsoni*, however, is now reduced to *M. ovata* by Small (N. Am. Fl. xxv. 155).

Mimosa leptocarpa *Rose*, 326.—Mexico (Manzanillo).
Mimosa manzanilloana *Rose*, 326.—Mexico (Manzanillo).
Panicum Pringlei *Vasey apud Rose*, 363.—Mexico (Jalisco; Colima). Overlooked by Scribner, who described it as a new species *Ixophorus Pringlei* (U.S. Dept. Agric., Div. Agrost., Bull. 4, 6; 1897), and by Hitchcock, who reduced *I. Pringlei* to *I. unisetus* (Presl) Schlecht. (Contrib. U.S. Nat. Herb. xvii. 265; 1913). According to Hitchcock the species occurs also in the States of Tepic, San Luis Potosi, Morelos and Guerrero, and in Central America.
Paullinia sessiliflora *Radlkofer apud Rose*, 317.—Mexico (Colima; Manzanillo).
Piper Palmeri *C.DC. apud Rose*, 354.—Mexico (Colima).
Piper Palmeri var. manzanilloanum *C.DC. apud Rose*, 354.—Mexico (Manzanillo).
Piptadenia leptocarpa *Rose*, 325.—Mexico (Manzanillo).
Porophyllum Palmeri *Rose*, 338.—Mexico (Colima).
Sassafridium macrophyllum *Rose*, 355.—Mexico (Manzanillo).
Schrankia diffusa *Rose*, 327.—Mexico (Manzanillo).
Serjania albida *Radlkofer*, 367.—Lower California (Santa Agueda).
Serjania brachylopha *Radlkofer*, 367.—Mexico (Tequila, Jalisco).
Serjania fuscopunctata *Radlkofer apud Rose*, 315.—Mexico (Manzanillo).
Serjania rutaefolia *Radlkofer apud Rose*, 316.—Mexico (Agiabampo).
Serjania trifoliolata *Radlkofer apud Rose*, 317.—Mexico (Manzanillo).
Spigelia Palmeri *Rose*, 342.—Mexico (Manzanillo).
Tephrosia multifolia *Rose*, 320.—Mexico (Manzanillo).
Tetramerium aureum *Rose*, 349.—Mexico (Colima).
Tetramerium diffusum *Rose*, 349.—Mexico (Manzanillo).
Tetramerium tenuissimum *Rose*, 349.—Mexico (Colima).
Tridax dubia *Rose*, 337.—Mexico (Colima).
Wissadula hirsutiflora *Rose*, 306: Bastardia hirsutiflora.
Xylosma horrida *Rose*, 303.—Mexico (Manzanillo).
Xylosma Palmeri *Rose*, 303.—Mexico (Manzanillo).
Zizyphus mexicana *Rose*, 315.—Mexico (Armeria).

XX.—MISCELLANEOUS NOTES.

Mr. J. W. Wright, a member of the gardening staff of the Royal Botanic Gardens, Kew, has been appointed by the Secretary of State for the Colonies, Assistant Curator, Dominica.

Lieut. A. S. Richardson, B.Sc., has been appointed by the Secretary of State for the Colonies, District Agricultural Officer, Tanganyika Territory.

Dr. L. A. Peringuey.—We regret to learn of the death on 20th February last of Dr. L. A. Peringuey, Director of the South

African Museum, Cape Town, and a regular correspondent of Kew. Although Dr. Peringuey was first and foremost a Zoologist, he was a man of remarkably wide interests, and indirectly did much to promote the study of botany in the Union. Some years ago he generously allowed Dr. E. P. Phillips, when his botanical assistant, to visit Kew for a year in order to elaborate the *Proteaceae* for the Flora Capensis, and lately the present occupant of the same post has spent a similar time at Kew preparing a Catalogue of the Flora of the South Western Protectorate, the completion of which Dr. Peringuey had very much at heart.

Dr. Peringuey was a leading authority on Entomology and Anthropology in South Africa, and was well known for his valuable studies on the antiquity of man in that region. One of the most remarkable of the many attractions of the South African Museum is his life-size models of the almost extinct race of bushmen. His papers ranged from an exhaustive descriptive catalogue of the *Coleoptera* of South Africa, begun in 1885 and occupying several volumes of the Journal of the South African Philosophical Society, to a study of the whales frequenting Cape waters and a treatise on insects injurious to forest trees. He dominated for many years zoological research at the Cape, and took a leading part in the foundation of the Royal Society of South Africa in 1908, being president from 1912 to 1917. He was also a member of the Entomological Society of London and of the Société Entomologique de France, as well as the South African representative for the International Catalogue of Scientific Literature.

J. H.

PRINCE ROLAND BONAPARTE.—We regret to record the death of Prince Roland Bonaparte, which took place in Paris on the 14th of April, 1924, in his 66th year. He was a grandson of Lucien Bonaparte, the second brother of Napoleon the First. Possessed of substantial private means and debarred (as he once wrote during the War) from serving his country in the army as he wished to do in his early life, he turned his attention to scientific studies, especially anthropology, geology, geography and natural history. In connection with these he made expeditions to America, Mexico, Finland and Lapland. In later years he turned his attention to ferns and became a frequent correspondent of Kew. He amassed a large herbarium of ferns, and, where specimens of rare species could not be obtained, he filled the gaps by procuring photographs of type specimens. From time to time he published reports on collections he acquired under the title of "Notes Pteridologiques," the first fascicle of which appeared in July, 1915, at which time he estimated his herbarium to contain about 300,000 specimens from all parts of the globe. Not only was he a worker himself and described new species, but also a generous patron of scientific work, giving financial assistance to such objects as marine laboratories, geological stations, observatories and scientific journals, and it was at his expense that Supplement II of Dr. Carl Christensen's "Index Filicum" was published. Kew has been indebted to him for interesting collections from Mexico and Spain, and by his death has lost a valued correspondent.

Gift of Garden Seats.—The amenities of the Gardens have recently been greatly enhanced by the very generous gift of one hundred seats, by a gentleman who desires to remain anonymous. The seats, which are designed for two persons, are made of strips of teak bolted on to iron supports and are of a comfortable shape, beautifully made, and of a very neat design.

Imperial Botanical Conference.—The following are the principal subjects arranged for discussion at the Conference which will be held at the Imperial College of Science and Technology from July 7th–16th.

I.—Systematic Botany and Ecology. The best means of promoting a complete Botanical Survey of the different parts of the Empire; Correlation of Taxonomic Work in the Dominions and Colonies with work at home; Vegetation Survey in different parts of the Empire, and Training in Field Ecology.

II.—Genetics. The Economic Possibilities of Plant Breeding; The value of Selection Work in the Improvement of Crop Plants.

III.—Plant Physiology. Cold Storage of Apples, an economic biological problem: Crop Physiology, modern methods of attack.

IV.—Plant Pathology. Obscure Plant Diseases of Widespread Occurrence; The Relation of Plant Pathology to Genetics; The Relation of Forest Pathology to Silviculture.

V.—Education and Research.

VI.—Miscellaneous. Wood Technology; Nomenclature. Lectures—Prof. A. C. Seward, F.R.S., "Records of Ancient Plants within the Empire"; Mr. F. A. Stockdale, "The Peradeniya Botanic Gardens"; Dr. J. M. Dalziel, "The Economic Botany of West Africa." Papers.

Excursions have been arranged as follows: The Royal Horticultural Society's Garden, Wisley; John Innes Horticultural Institution, Merton; Blakeney Point, Norfolk; Rothamsted Experimental Station; Royal Botanic Gardens, Kew, and Cambridge.

Further particulars can be obtained from the Secretary, Mr. F. T. Brooks, 31, Tenison Avenue, Cambridge.

The Genus Dicoma. My attention has been drawn to a breach of the International Rules of Nomenclature in my paper "Revision of the Genus Dicoma" (*K.B.* 1923, p. 377), which I would like to take this opportunity to correct. The three sections I there recognised should have borne the following names :—

Sect. I.—LEUCOPHYTON (*Less.*) *Endl.* Gen. i. 487 (1838).—Subgen. *Leucophyton* Less. Syn. Compos. 109 (1832). Sect. *Eudicoma* DC. Prodr. vii. 36 (1838). Sect. *Steirocoma* DC. l.c., partim ; Harv. in Harv. et Sond. Fl. Cap. iii. 515, partim. Sect. *Microcoma* DC. l.c. 306. Sect. *Dimorphae* F. C. Wilson in Kew Bull. 1923, 377.

Original species : *D. capensis* Less. and *D. tomentosa* Cass.

Sect. II.—MACLEDIUM (*Cass.*) *DC.* l.c. 37 ; Endl. l.c. ; Harv. l.c. ; emend. F. C. Wilson.—Genus *Macledium* Cass. in Dict. Sc. Nat. xxxiv. 39 (1825). Subgen. *Macledium* Less. l.c. 110. Subgen. *Rhigiothamnus* Less. l.c. 109. Sect. *Rhigiothamnus* DC. l.c. ; Harv. l.c. Sect. *Psilocoma* Harv. l.c. Genus *Brachyachaenium* Baker in Journ. Linn. Soc. Bot. xxv. 330 (1890). Sect. *Brachyachaenium* O. Hoffm. in Engl. Jahrb. xv. 545 (1893). Sect. *Barbellatae* F. C. Wilson l.c.

Original species : *D. relhanioides* Less., *D. diacanthoides* Less., and *D. Burmanni* Less.

Sect. III.—PTEROCOMA *DC.* l.c. ; Endl. l.c. ii. 1386 ; Harv. l.c. ; O. Hoffm. l.c. 546.—Sect. *Plumosae* F. C. Wilson l.c.

Original species : *D. speciosa* DC.

For purposes of priority, subgenera and sections are treated in the Rules as belonging to the same " rank." *Leucophyton, Eudicoma, Steirocoma,* and *Microcoma* all appeared as sectional names in 1838. *Leucophyton,* however, dates from 1832, when it was published as a subgenus, and consequently has priority over the other names.

I would also like to take this opportunity of thanking Mr. J. Hutchinson for his help and advice during the preparation of my paper, as this acknowledgment was inadvertently omitted.

F. C. W.

Scientific Expedition to the South Pacific.—The First Expedition organised by the Scientific Expeditionary Research Association left Dartmouth on April 9th, 1924, for the South Pacific on board the S.Y. St. George. The expedition will be calling at Madeira and Trinidad and after passing through the Panama Canal will call at Malpelo and Gorgona and also at Albemarle Island (Galapagos). Easter Island, Pitcairn Island and other Pacific Islands will also be visited. Mr. L. A. M. Riley, who has been working for some time in the Herbarium, is the botanist on the scientific staff of the expedition, and the first set of botanical specimens collected in the Pacific will be presented to the Royal Botanic Gardens.

Botanical Magazine.—The second part of volume 149 (1923) was published on March 3rd, 1924, and contains eleven figures representing the following plants :—*Primula suffrutescens* A. Gray (t. 8990), a native of the Sierra Nevada, California ; *Schizophragma integrifolium* Oliv. (t. 8991), from Central and

Western China; *Hardenbergia Comptoniana* Benth. (t. 8992), from Western Australia; *Rhododendron Searsiae* Rehder and Wilson (t. 8993), also from China; *Lithospermum oleifolium* Lapeyr. (t. 8994), a native of the Pyrenees; *Thryptomene thymifolia* Stapf (t. 8995), from Australia; *Epidendrum Cristobalense* Ames (t. 8996), from the mountains of Costa Rica; *Lavatera bicolor* Rouy (t. 8997), from the French Riviera; *Callistachys ovata* Sims (t. 8998), from Western Australia; *Cotoneaster salicifolia* Franch. (t. 8999), from Western China; and *Amorphophallus cirrifer* Stapf (t. 9000), a native of Siam.

Across the Great Craterland to the Congo.*—To the botanist the most interesting part of Mr. Barns' book is the series of excellent plates which give a very fine presentation of the types of vegetation he encountered among the giant craters in Tanganyika and in the tropical forests of the Congo. The detail of the photographs is so good that in many cases it was possible to identify the plants portrayed from prints sent to Kew by Mr. Barns. This, to a large extent, compensates for the meagre references to the vegetation in the text, and it is much to be regretted that the expedition was unable to make representative collections of the flora of the very interesting and little-known areas through which they passed. The work will form a welcome addition to preliminary studies of the types of vegetation of the area traversed. A copy of the work has been very kindly presented to Kew by the author.

A Handbook of Cultivated Plants.†—"The purpose of this book is to provide a ready means for the identification of the species in the usual domestic flora of the continental United States and Canada." It is a handy octavo volume of 851 pages, and contains descriptions of 3,665 species under 1,246 genera. Most floras deal either superficially or not at all with the plants which are merely cultivated in their areas, and the material of important cultivated species preserved in herbaria is often very imperfect. Hence the identification of plants which are known only in cultivation has hitherto presented great difficulties. This task will be much faciliated by the excellent keys and descriptions provided by Dr. Bailey in the work under review. The genera *Phaseolus* and *Cucumis* may serve as illustrations. Under the former are descriptions of the Kidney Bean, Scarlet Runner, Sieva Bean, Lima Bean, Urd (Black Gram), Mung (Golden Gram), Adzuki, Rice and Moth Beans, and of several varieties. The latter includes besides the Bur Gherkin, Hedgehog Gourd and Cucumber, descriptions of seven different horticultural varieties of Melon. The treatment of ornamental plants

* By Alexander Barns, with an introduction by J. W. Gregory. Ernest Benn, Ltd., London; pp. 276, ill. 82, maps 2; 1923; 25*s*.

† Manual of Cultivated Plants. By L. H. Bailey. New York and London: Macmillan & Co. 1924. Price £1 11*s*. 6*d*. net.

is equally satisfactory. The tuberous begonias of gardens are grouped together as *Begonia tuberhybrida* Voss, which is what Bailey designates as a *cultigen*, namely, a group which has originated in cultivation, and is more or less comparable, as regards the importance of its differential characters, with a wild species. Similarly the orchid-flowered horticultural races of *Canna* (e.g., Italia) are classed together under the name *C. orchiodes*, while the common flowering Cannas are included in the cultigen *C. generalis*. The families are arranged according to the Engler-Prantl system, and the generic and specific names follow the International Rules. Full use has been made of the page headings, which bear the name of the family in the centre, with the first and last genera to left and right respectively. There is only one index, including both common and scientific names. It only remains to add that a high standard is maintained throughout the work, and that it will serve to enhance the reputation of its author.

T. A. S.

Wild Flowers of Kashmir*.—By the publication of this book Mr. B. O. Coventry gives visitors, even those who are not familiar with botanical terms, an opportunity of an acquaintance with the rich flora of Kashmir. After an introduction containing an explanation of the meaning of the technical words used he presents 51 plates reproduced in natural colours from Lumière autochromes taken in the field by himself. A technical description as well as notes on the peculiarities and uses of the plants accompany each plate. Mr. Coventry is to be warmly congratulated on this publication especially in regard to the production of the autochrome plates which requires considerable skill and perseverance. The succeeding series of this work will be awaited with interest.

S. T. D.

The Flower Seeker.† —This is an attempt by means of simple language and illustrations to enable the common wild flowers to be identified. The plants are classified according to their habitats and flowering seasons. The first 36 pages contain a key founded on obvious features and are followed by more detailed descriptions. The book should be useful to those who wish to identify wild flowers without technical descriptions.

Garden Operations, 1923.—In the report under this heading in *K.B.* 1924, p. 30, *Cladrastis tinctoria* Hemsley should read *Cladrastis sinensis* Hemsley.

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* Wild Flowers of Kashmir (Series I). B. O. Coventry. Raithby, Lawrence & Co., London, 1923, pp. xxxii, 102, 51 coloured plates. Price 15s.

† The Flower Seeker, by Forster Robson. Sm. 8vo. 184 pp., 16 plates and many text figures. Cassell & Co., Ltd. Ed. 2. London, 1924. 3s. 6d.

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ROYAL BOTANIC GARDENS, KEW.

BULLETIN
OF
MISCELLANEOUS INFORMATION.

No. 5] [1924

XXI.—REVISION OF THE GENUS SPHAERANTHUS.

W. Robyns.*

The present revision of the genus *Sphaeranthus* (*Compositae*) is mainly based upon the specimens belonging to the herbaria of the Royal Botanic Gardens, Kew, of the Natural History Museum, South Kensington, and of Brussels. The rich collections of these institutions contain representatives of nearly all the species here dealt with. The author wishes to express his thanks to the Directors of these institutions, and particularly to the Director of the Royal Botanic Gardens, Kew, for the many facilities afforded to him. He is especially indebted to Mr. J. Hutchinson, Assistant in the Herbarium, Kew, whose valuable help and most kind advice he was able to appreciate fully during his short stay at Kew.

Historical.—The genus *Sphaeranthus* was founded by Vaillant in 1719 (1). In 1753, Linnaeus (2) described *S. indicus*, which is the oldest and best known species. De Candolle, in his Prodromus (1836) (3), subdivided the genus into three sections. Sect. I. *Eusphaeranthus*: compound heads with solid main axis; bracts all linear, soft, nearly as long as the partial heads, the outer ones scarcely forming a general involucre: Indian species. Sect. II. *Cuspidella*: common receptacle nearly solid or scarcely hollow; bracts spiny mucronate, the outer scales forming a distinct common involucre, the others scarcely longer than the partial heads; African species. Sect. III. *Polycephalos*: common receptacle generally hollow; bracts all ovate-lanceolate, cuspidate, firm, longer than the partial heads, the outer ones hardly or not forming a general involucre: India, Africa and Australasia. Steetz (1862–4) (4) in a revision of *Sphaeranthus*, and following the descriptions of Robert Wight (1846) (5), divided the genus into two: *Sphaeranthus* and *Oligolepis* Wight. He subdivided *Sphaeranthus* into two

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* Dr. Walter Robyns, of the University of Louvain, Belgium, spent some months at Kew during last summer, and besides assisting in the naming of African collections prepared this revision of the Composite genus *Sphaeranthus*.

18064. Wt. 152–28. 1000. 6/24. Wy. & S., Ltd. Gp. 50. (4).

sections, *Eusphaeranthus* and *Polylepis*. According to Steetz the genus *Oligolepis* differed mainly from *Sphaeranthus* and especially from *Eusphaeranthus* by the partial heads being closely pressed together and hidden amongst the bracts of the common receptacle, by the asymmetrical involucre, the scales distinctly longitudinally folded, embracing the female flower, the others boat-shaped or flat; male flower always solitary; peduncles always shorter than the compound heads. Steetz only enumerated 7 species known to him, four of *Sphaeranthus* and three of *Oligolepis*, with three not seen by him and two dubious species. Oliver (1877) (6) gave descriptions of seven species occurring in Tropical Africa, and united *Oligolepis* with *Sphaeranthus*. Hoffmann (1894) (7) divided the sixteen African species known to him into two sections as follows:—I. *Multiflori*; partial heads with 7 or more bracts and numerous female flowers. II. *Pauciflori*; partial heads with 2–4 or sometimes 6 bracts, and up to 6 female flowers. To this arrangement Muschler (1911) (8) enumerated eight additional species.

The present revision has been undertaken on account of the confusion still existing in regard to the synonymy of the older species, and because of the difficulty attending the determination of additional material. The classification here adopted has been established after careful dissections of nearly all the species, which combined with the external characters seem to give a true phylogenetic arrangement. The number of species has now increased to thirty-eight, of which nine are described here for the first time.

Emended description of the genus *Sphaeranthus*.

Herbae erectae vel rarissime procumbentes, interdum suffrutescentes, in locis humidis vel exsiccatis crescunt, glabrae et etiam glanduloso-punctatae, hirsutae vel villosae; caules simplices vel plerumque ramosi, cum pedunculis alati vel rare exalati, alis integris vel laceratis; folia alterna, sessilia, in caulem decurrentia, integra vel leviter dentata. *Capitulorum glomeruli* terminales, rarissime axillares vel caulis basin versus dispositi (*S. epigaeus*), saepe numerosi et pedunculati, ovoidei vel depresso-globosi (*Pseudosphaeranthus*) et bracteis exterioribus involucrati, cylindrici vel globosi (*Eusphaeranthus*) et exinvolucrati; receptaculum commune plerumque ambitu glomerulorum conformatum nudum vel rugosum; bracteae involucri vel subtendentes semper mucronatae vel acuminato-apiculatae, rigidae. *Capitulorum squamae* 3–14, plerumque circiter 4–10, plus minusve membranaceae et saepe ciliatae; capitula propria semper sessilia, heterogama, disciformia, floribus exterioribus ♀ interioribus ⚥, receptaculo nudo. *Flores* ♀ 2–35, interdum stipitati; corolla tenuiter tubulosa, minute 2–4-dentata, interdum basi incrassata; stylus apice bifidus, glaber. *Flores* ⚥ 1–7, plerumque 1–2, saepe sessiles; corolla tubulosa, saepe crassa et spongiosa, in limbum

5-dentatum expansa ; antherae basi sagittatae ; stylus plerumque divisus, papillosus. Achaenia fertilia plerumque angularia, saepe glandulosa.

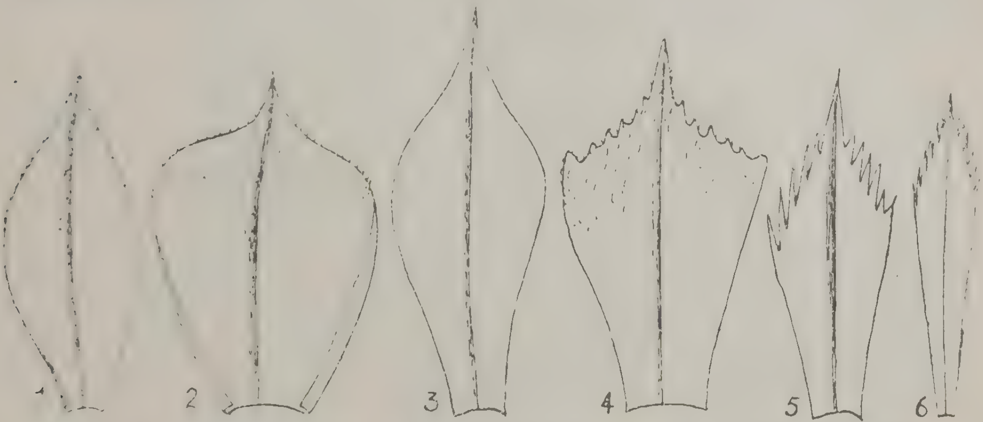

Fig. I. Forms of bracts in *Sphaeranthus* : outer subtending bracts of 1, *S. cyathuloides*. 2, *S. Johnstonii*. 3, *S. amaranthoides*. 4, *S. suaveolens*. Bracts of separate heads of 5, *S. ukambensis*. 6, *S. humilis*.

Subdivision and affinities of the genus.

In subdividing the genus into the following groups I have used mainly such characters as seemed to be constant and which might be regarded as of phylogenetic importance. Such are (1) the shape of the compound heads, (2) the nature of the subtending bracts, (3) the degree of reduction in the number of flowers in the partial heads, (4) the presence or absence of a rudimentary pappus, with other characters of less importance (stems winged or not, indumentum, leaf-shape, etc.).

In this way the following groups have been established.

Subgenus I. **Pseudosphaeranthus** ; compound heads ovoid or depressed-globose ; outer bracts forming a distinct common involucre ; partial heads with about 4 (rarely up to 10) bracts, one of which subtends each head and is larger than the others and mucronate. (See Fig. II., 1–3.)

Section 1. OOCEPHALAE ; compound heads ovoid, ovoid-elongated or ovoid-globose ; common receptacle always hollow inside.—Sect. *Cuspidella* DC. Prodr. 5 : 370 in part ; Sect. *Polycephalos* DC. l.c. in part.

Section 2. PLATYCEPHALAE ; compound heads depressed-globose, in cross section flat on top or nearly so.

Subgenus II. **Eusphaeranthus** ; compound heads cylindric, oblong or globose ; no common involucre of bracts present ; partial heads with about 10 bracts all more or less of the same size and shape.—DC. Prodr. 5 : 369 as section, in part. (See Fig. II., 4–5.)

Section 3. CYLINDROCEPHALAE ; compound heads cylindric or oblong, longer than broad, the common axis elongated.—Sect. *Eusphaeranthus* DC. l.c. in part ; Sect. *Polycephalos* DC. l.c. in part.

Section 4. SPHAEROCEPHALAE ; compound heads spherical-globose, in cross section showing a similar hollow rounded common receptacle.—Sect. *Cuspidella* DC. in part ; Sect. *Eusphaeranthus* DC. l.c. in part.

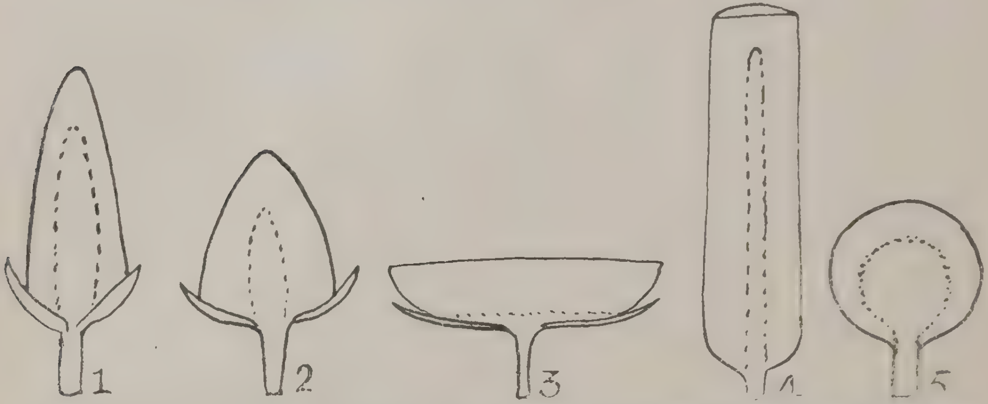

Fig. II. Diagrams showing shapes of compound heads of the four sections of *Sphaeranthus :* 1 and 2, Section *Oocephalae.* 3, *Platycephalae.* 4, *Cylindrocephalae.* 5, *Sphaerocephalae.*

In this genus *Sphaeranthus*, which is highly specialised on account of its compound heads, one might expect to find some evidence of descent from allied and more primitive genera ; and in endeavouring to trace this evidence one would naturally select a group in which the heads are more or less elongated or ovoid, suggesting descent from ancestors with either spicate or closely corymbose flower heads. In this respect I find two distinct types of compound heads which have probably been evolved on similar lines : the one represented by the subgenus *Pseudosphaeranthus* having its most primitive species represented in the section *Oocephalae* by *S. cyathuloides* and *S. Johnstonii*, which have not only the ovoid compound heads, but also the rudiments of a pappus, besides stipitate female flowers. It is significant, too, that this group is also common to both East Africa and India, suggesting a closer connection between these two regions in the past. The depressed-globose section *Platycephalae* is evidently only a further specialisation of the *Oocephalae* group. The second type, *Eusphaeranthus*, finds its most primitive species in section *Cylindrocephalae*, especially in *S. ukambensis*, which has an elongated spike-like inflorescence. The further reduction of this group gives us the *Sphaerocephalae*, which appears to be the more recently evolved, and includes some of the most widely spread species of the genus, i.e. *S. africanus*, *S. indicus* and *S. senegalensis*.

I am quite unable to point out a genus which would suggest itself as a primitive representative of the subgenus *Pseudosphaeranthus* ; but it is otherwise with the subgenus *Eusphaeranthus*, which may be closely connected with *Pterocaulon* Ell. There seems to be considerable affinity between the Indian *Pterocaulon cylindrostachyum* Clarke, and the East

African *Sphaeranthus ukambensis*, the pappus being the major feature separating them, whilst the Australian *Pterocaulon sphaeranthoides* greatly resembles *Sphaeranthus variabilis* and *S. indicus*.

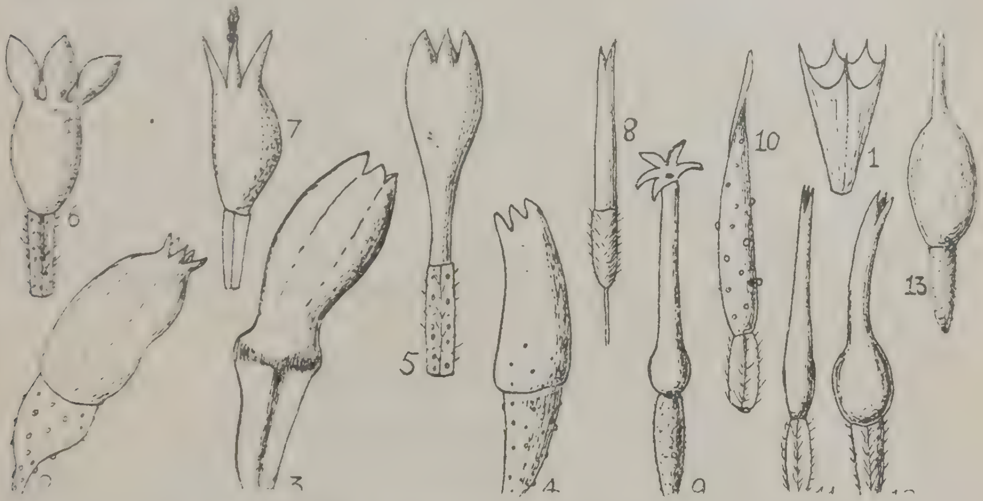

Fig. III. 1. Ovary and rudimentary pappus of *S. cyathuloides*. 2-7, some forms of hermaphrodite flowers: 2, *S. strobuliferus*. 3, *S. keniensis*. 4, *S. Steetzii*. 5, *S. Talbotii*. 6, *S. sphenocleoides*. 7, *S. indicus*. 8-13, some forms of female flowers: 8, *S. cyathuloides*. 9, *S. angustifolius*. 10, *S. epigaeus*. 11, *S. variabilis*. 12, *S. angolensis*. 13, *S. africanus*.

COMPOSITION OF THE FLOWER HEADS.

The compound heads (glomerules) are always made up of a large number of sessile partial heads. In these partial heads a certain number of bracts form a protecting involucre and inside the bracts a certain number of female flowers generally surround a few hermaphrodite flowers, the latter occupying constantly the central portion of the heads.

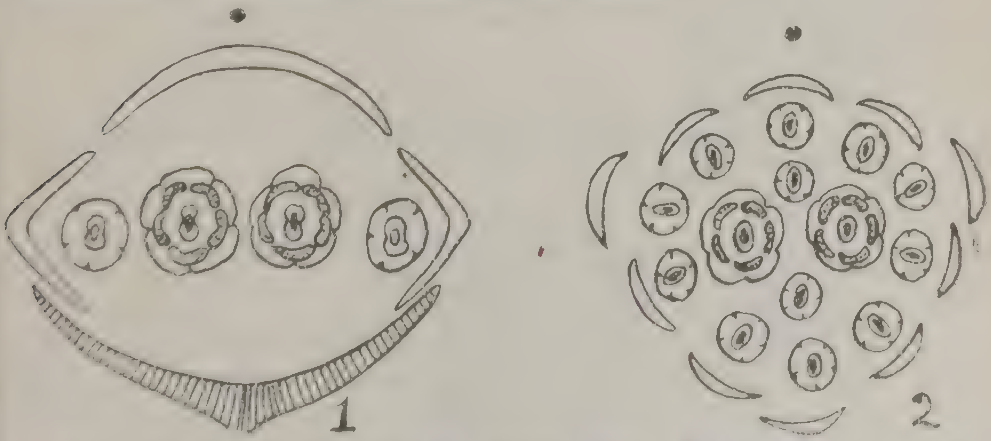

Fig. IV. 1, Diagram showing ground plan of *Pseudosphaeranthus*. 2, that of *Eusphaeranthus*.

In the subgenus *Pseudosphaeranthus* each partial head is provided with a subtending outer bract and generally with an adaxial inner bract and two lateral bracts, which are more or less longitudinally folded. The number of flowers in each partial head is often variable according to the position they occupy. The outer heads have sometimes only ♀ flowers without ☿ flowers, but towards the top or the centre of the compound heads, the number of ♀ flowers diminishes and the ☿ flowers appear so that finally the most central partial heads have often 2 ☿ flowers and 4 ♀ flowers in the *Oocephalae*, and one ♀ flower and 2-6 ☿ flowers in the *Platycephalae*.

In the subgenus *Eusphaeranthus* there is no indication whatever of subtending bracts; all the bracts are the same in each partial head, only sometimes there are outer and inner bracts. Thereby the composition of the partial heads is constant and does not vary with the position they occupy on the common receptacle.

KEY TO THE SPECIES.

Subgenus I.—**Pseudosphaeranthus.**

Section I. OOCEPHALAE. Compound heads ovoid, ovoid-elongated or ovoid-globose: common receptacle always hollow inside.

* Compound heads terminal, not towards the base of the stem:

Pappus developed in the ☿ flowers; ♀ flowers stipitate; stems not or only slightly winged:

Subtending bracts of the partial heads in about 20 series, gradually acutely acuminate, not membranous on the margins ....1. *cyathuloides*.

Subtending bracts of the partial heads in about 10 series, rather abruptly acuminate, the margins more or less membranous ....2. *Johnstonii*.

Pappus not developed in the ☿ flowers (except in *S. gomphrenoides*); flowers sessile or subsessile; stems usually winged:

†Stems usually branched, over 15 cm. high:

Stems not winged, glabrous; leaves linear, glabrous, denticulate:

Heads cone-like, subsessile, hard, red, about 2 cm. long; subtending bracts with short triangular points, glabrous ....3. *Kirkii*.

Stems distinctly winged:

‡Subtending bracts glabrous; heads usually subsessile:

Heads reddish brown, almost cylindrical, up to 2·5 cm. long; subtending bracts gradually long-acuminate; ovary rounded, glabrous .... 4. *amaranthoides*.

Heads stramineous, broadly ovoid, less than 1·5 cm. long; subtending bracts gradually long-acuminate; ovary angular .... 5. *zeylanicus*.

Heads reddish, ovoid, about 1·5 cm. long; subtending bracts broad, usually abruptly and shortly mucronate:

Heads subsessile; ☿ flower cylindric:

Subtending bracts very abruptly acuminate; wings of stem broad; Persia .... 6. *strobuliferus.*

Subtending bracts gradually acuminate; wings of stem very narrow; East Africa .... 7. *cristatus.*

Heads pedunculate; ☿ flower contracted at the base:

Stems erect; outer bracts broadly ovate, those subtending the partial heads broadly oblong-obovate mucronate ... 8. *keniensis.*

Stems prostrate; outer bracts lanceolate, those subtending the partial heads broadly linear, long-apiculate...... 9. *gomphrenoides.*

‡‡Subtending bracts hairy, scabrid or glandular; heads stalked:

Heads oblong-ovoid, about 2 cm. long; subtending bracts long-acuminate, hirsute, ciliate; Burma .... 10. *peguensis.*

Heads globose-ovoid, usually much less than 2 cm. long; subtending bracts usually shortly acuminate:

§Leaves glabrescent:

Leaves usually about 2 cm. broad, oblong or linear-oblong, distinctly toothed; peduncle short, conspicuously winged, thick .... 11. *suaveolens.*

Leaves linear, usually not more than 1 cm. broad; peduncle rather slender:

Wings of stem entire or slightly denticulate:

Peduncles glabrous, usually conspicuously winged; stems simple or slightly branched, glabrescent 12. *angustifolius.*

Peduncles more or less hairy or scabrid, not winged:

Peduncle usually about 4 cm. long; subtending bracts shortly mucronate, the outer ones not conspicuous; South Africa .... 13. *peduncularis.*

Peduncle not more than 1·5 cm. long; subtending bracts quite distinctly apiculate or aristate, the outer ones very conspicuous:

Subtending bracts glabrescent; ⚥ corolla not contracted at the base; East Africa .... 14. *Steetzii.*

Subtending bracts glabrescent; ⚥ corolla contracted in the lower part; West Africa .... 15. *Talbotii.*

Wings of stem incised; stems much-branched, hairy or glandular .... 16. *incisus.*

§§Leaves rather densely pubescent; heads about 4 mm. in diameter; subtending bracts very small; ⚥ flowers 4–5; ♀ flowers 8–5; Madagascar .... 17. *cotuloides.*

††Stems simple, not winged, up to 9 cm. high; leaves oblanceolate, acute, villous, subentire; heads very shortly stalked; ⚥ flowers 3–4, ♀ flowers about 9 .... 18. *calcareus.*

**Compound heads lateral:

Compound heads axillary in the upper leaves, solitary or glomerate; stems winged ...... 19. *Stuhlmannii.*

Compound heads inserted singly near the ground at the base of the shoots, subsessile; ⚥ flower 1, ♀ flowers 6–8 in each partial head .... 20. *epigaeus.*

Section II. PLATYCEPHALAE. Compound heads depressed-globose, the inner section showing the depression quite well.

Wings of stem entire or very slightly toothed:

Stems and leaves nearly glabrous; ovary and corolla nearly glabrous; Northern Nigeria .... 21. *Lelyi.*

Stems and leaves hairy; ovary and corolla very glandular; East Africa .... 22. *nubicus.*

Wings of stem coarsely toothed or jagged:

Peduncles not winged, thinly pubescent, terminal and lateral; North East Africa:

Partial heads numerous with 6–8 bracts; ♀ flowers 6 .... 23. *neglectus.*

Partial heads rather few with 3 bracts; ♀ flowers 2 .... 24. *Fischeri.*

Peduncles not winged, villous-pubescent, terminal; leaves up to 6 cm. long and nearly 2 cm. broad; Rhodesia .... 25. *Rogersii.*

Peduncles winged, villous, terminal and lateral; leaves up to 1 cm. long and less than 5 mm. broad; Madagascar .... 26. *madagascariensis.*

Subgenus II.—**Eusphaeranthus.**

Section III. CYLINDROCEPHALAE. Compound heads cylindric or oblong, common axis elongated.

Compound heads elongated, cylindric, up to 4·5 cm. long and 6 mm. broad; partial heads numerous; peduncle not winged but ribbed .... 27. *ukambensis.*

Compound heads oblong to broadly ellipsoid; partial heads usually less numerous and large, peduncle winged:

Wings of the stem denticulate or jagged; plant more or less tomentose; heads up to 1·3 cm. long; ♀ flowers 8 .... 28. *variabilis.*

Wings of the stem entire; plant quite glabrous; heads about 1 cm. long; ♀ flowers 20–35; Zanzibar
.... 29. *sphenocleoides.*

Section IV. SPHAEROCEPHALAE. Compound heads spherical-globose, inner section showing a similar hollow rounded common receptacle.

Plants glabrescent or puberulous; partial heads large with 20–30 ♀ flowers; wings of stem entire or slightly denticulate:

Plants densely puberulous; leaves about 1 cm. long, thick; ☿ flowers 5, ♀ flowers about 30 in each partial head
.... 30. *confertifolius.*

Plants glabrous or glabrescent; leaves about 4–7 cm. long, thin; ☿ flowers 2–3, ♀ flowers 20–22 in each partial head .... 31. *africanus.*

Plants more or less hairy; partial heads small with few (rarely up to 16) ♀ flowers; wings of stem coarsely toothed or jagged, sometimes absent:

* ♀ Flowers about 9–16; peduncle of central flower head usually conspicuously winged:

Stems winged:

Heads usually numerous and small, about 7–8 mm. in diameter; stem and leaves pubescent; ♀ flowers about 16 .... 32. *angolensis.*

Heads rather few, usually more than 1 cm. in diameter:

Stem and leaves pilose; ♀ flowers 12–16
.... 33. *indicus.*

Stem and leaves rather densely and softly lanate: ♀ flowers about 9........................... 34. *senegalensis.*

Stems not winged, about 30 cm. high; peduncles up to 1·5 cm. long:

Stems prostrate, flexuose; heads axillary; ☿ flowers 2 in each partial head; Congo .... 35. *flexuosus.*

Stems erect, not flexuose; heads terminal and lateral; ☿ flowers 3 in each partial head; Eastern Sudan
.... 36. *Brounae.*

** ♀ Flowers about 4–5; peduncle of central flower head not winged:

Plants dwarf and slightly branched, with few heads about 1 cm. in diameter; peduncle up to 6 cm. long; Angola, Zambesi basin .... 37. *humilis.*

Plants tall and much branched, with very numerous small heads about 6 mm. in diameter; peduncle up to 1·5 cm. long; Tanganyika Territory .... 38. *polycephalus.*

Subgenus I. **Pseudosphaeranthus.**

Section I.—OOCEPHALAE.

1. **S. cyathuloides** *O. Hoffm.* in Engl. Bot. Jahrb. 20: 229 (1894).

Bracts of partial head 4: ☿ flowers 2, sessile; pappus rudimentary; corolla large, contracted immediately below the 5 teeth: ♀ flowers 4, stipitate; ovary angular, hairy; corolla small.

TROPICAL AFRICA: Kenya Colony: Ukamba near Adi River and N'deo, in moist places, March 1877, *Hildebrandt* 2611 (type). Near Nairobi, *Miss M. J. Johnstone* 152!

2. **Sphaeranthus Johnstonii** *Robyns* sp. nov.; affinis *S. cyathuloidei* O. Hoffm., sed capitulorum bracteis subtendentibus paucioribus circiter 10-seriatis abrupte acuminatis marginibus plus minusve membranaceis differt.

Herba annua parce ramosa, ramulis glabris erectis plerumque exalatis, *Folia* sessilia, lineari-lanceolata, apice saepe acuminata, basi leviter cordata, amplexicaulia, usque ad 6 cm. longa et 0·5 cm. lata, nervis adscendentibus marginibus denticulatis, glabra. *Glomeruli* ovoidei vel ovoideo-elongati, apice saepe acuti, breviter pedunculati, pedunculo saepe incrassato exalato, usque ad 1·5 cm. longi et circiter 0·8 mm. lati. *Capitulorum bracteae* subtendentes circiter 10-seriatae, amplissimae, obtusae, abrupte acuminatae, marginibus plus minusve membranaceis, hirsutae. *Squamae* laterales 2, bracteis subtendentibus angustiores. *Flores* ☿ 2, corolla crassa sub limbi dentibus ciliatis constricta, pappo valde rudimentario; flores ♀ 4, stipitati, cum ovario angulato hirsuto.

TROPICAL AFRICA. Kenya Colony: Baringo, at about 1100 m., buds mauve, leaves dark green, March 1901, *H. H. Johnston* (type)! Near Mariakani at about 220 m., *Kassner* 450! Witu, *Thomas* 125! Ukambani; Kibwesi station, herb 30–50 cm. high, in sunny grassy places with red clayey soil. *Scheffler* 73! Nairobi; Attii plains, at about 1800 m., *Dummer* 1941! *Whyte*! Ngomeni, plant with strong scent and purple flowers, *Scott Elliot* 6262! Tanganyika Territory: in the lower half of Madschame, 1000 m., Jan. 1894, *Volkens* 1631! Dar es Salaam, *Stuhlmann* 7889!

3. **S. Kirkii** *Oliv. et Hiern* in Fl. Trop. Afr. 3: 333 (1877).

Subtending bracts large, obtuse, with short mucro, glabrous: adaxial bracts very small: ☿ flowers 2; ovary angular without pappus, glabrous, with sessile glands on the enlarged upper margins: ♀ flowers 4, subsessile.

Tropical Africa. Tanganyika Territory: Bagamayo, Oct. 1867, *Kirk* (type)!

4. **S. amaranthoides** *Burm.* Fl. Ind. 186 (1768); Hook. f. Fl. Brit. Ind. 3: 274, partim.

Oligolepis amaranthoides Wight in Calc. Journ. Nat. Hist. 7: 161; Ic. Pl. t. 1145.

Subtending bracts mucronate, glabrous; adaxial bracts truncate, with small teeth at the upper end: ☿ flowers 2, corolla small; ovary round, with upper empty part quite glabrous: ♀ flowers 4, stipitate; ovary hairy.

India. Madras: Coimbatore, without locality, September 1890, *Wight* 1553! *Hooker and Thomson* 131! Anamalay, July 1848, *Wight* 1553!

Ceylon. *Thwaites* 1768!

5. **S. zeylanicus** *Heyne* in Wall. Cat. 3180, *nomen*; affinis *S. amaranthoidei* Burm., sed glomerulis stramineis ovoideis brevioribusque et numero ☿ florum in capitulis valde differt.

Herba annua, probabiliter tantum usque ad 30 cm. alta, ramulis erectis rotundatis semper alatis glabris. *Folia* sessilia, in alis integerrimis decurrentia, apice obtusa, rotundata, leviter mucronata, basi angustiora, usque ad 7 cm. longa et 1·5 cm. lata, minute denticulata, glabra. *Glomeruli* pauci, late ovoidei, subsessiles, straminei, vix 1·5 cm. longi. *Bracteae* subtendentes sensim longe acuminatae, scariosae, omnino glabrae; bracteae adaxiales truncatae, cum mucrone medio breve. *Flos* ☿ 1, sessilis, corolla crassa sub limbi dentibus constricta, ovario rugoso; ♀ flores 4, sessiles, corolla valde tenue, ovario hirto.

Without locality, but probably from Ceylon, *Wight in Herb. Wallich* 3180B! *Wight* 1416 (type)!

India. Madras: Coimbatore; swampy places near Bolampatty, 450m., Dec. 1880, *Beddome* 4389!

6. **S. strobuliferus** *Boiss. et Noë* in Boiss. Diagn. Ser. ii. 3: 6 (1856).

Subtending bracts broad, obtuse, long-acuminate, with membranous margins, glabrous: ☿ flowers 2, subsessile; ovary short, glabrous, with scattered glands; corolla very broad, contracted in the upper part: ♀ flowers 4, subsessile: ovary hairy.

Persia. Bagdad, in cultivated fields, *Haussknecht* 1868! Muhammareh, *Noë* 329!

7. **S. cristatus** *O. Hoffm.* in Engl. Bot. Jahrb. 24: 470 (1898).

Tropical Africa. Tanganyika Territory : Usambara ; in the Madunu Swamp, Sept. 1892, *Holst* 3970.

I have not seen a specimen of this species.

8. **Sphaeranthus keniensis** *Robyns* sp. nov. ; ex descriptione per affinis *S. gomphrenoidei* O. Hoffm., caulibus erectis, bracteis exterioribus late ovatis, bracteis capitulis subtendentibus late oblongo-obovatis (nec linearibus) mucronatis differt.

Herba annua erecta, valde ramosa, ramulis glabris adscendentibus rotundatis conspicue alatis, alis subintegris. *Folia* lineari-lanceolata, apice mucronata, basi lata, amplexicaulia, decurrentia, nervis lateralibus adscendentibus paucis et vix distinctis, fere 4 cm. et interdum usque ad 8 cm. longa, circiter 0·5-1 cm. lata, denticulata, subglabra. *Glomeruli* numerosi late ovoidei, apice acuti, pedunculati, pedunculo alato usque ad 1·5 cm. longo. *Bracteae* exteriores late ovatae ; capitulorum bracteae subtendentes late oblongo-obovatae, omnes mucronatae sub mucrone cum maculo nigrescente, marginibus superioribus leviter denticulatae, marginibus lateralibus membranaceis, subglabrae. *Flores* ⚥ 2, sessiles, cum ovario magno angulare glabri ; corolla magna, ovario circiter aequilonga, basi conpicue constricta, glabra et interdum leviter glandulosa. *Flores* ♀ 4, subsessiles, ovario hirto.

Tropical Africa. Kenya Colony : Kibose, 1906, *Powell* (type)! Without locality, *C. F. Elliott* 382 ! Near lake edge, Kisumu, about 1200m., Febr. 1915, *Dummer* 1778 ! Uganda, 6th day from Mumias, 1898, *Whyte* 131 !

9. **S. gomphrenoides** *O. Hoffm.* in Engl. Bot. Jahrb. 20 : 229 (1895).

Tropical Africa. Kenya Colony : without locality, *Fischer* 335.

I have not seen a specimen of this species.

10. **S. peguensis** *C. B. Clarke*, Comp. Ind. 97 (1876).

Subtending bracts elongated, gradually long-acuminate, long-ciliate : ⚥ flower 1, sessile ; ovary small, hairy ; corolla narrow in the lower part, broader above : ♀ flowers 4–5, subsessile ; ovary ciliate.

Burma. Pegu, *Kurz* 2259 (type) ! Prome, *Kurz in Herb. Hance* 18691 !

11. **S. suaveolens** *DC.* Prodr. 5 : 370 ; Lam. Ill. Fl. 718 fig 2.

S. indicus Gaertn. Fruct. 2 : 413, t. 164. f. 5 : Willd. Sp. Pl. 3 : pars. iii, 2394. non Linn. *S. abyssinicus* Steetz in Peters Mossamb. Bot. 411. *S. angustifolius* Sch. Bip. in Kotschy, Hb. Nub. no. 463.

Partial heads short and large ; scales 6, subtending scale oblong-lanceolate, mucronate, ciliate and rugose on the back side : ⚥ flowers 3–4, sessile, corolla spongy, large ; ovary angular, glabrous with scattered glands: ♀ flowers 9–10, sessile, corolla glabrous, constricted at the top, 2-toothed; ovary angular, hairy.

EGYPT. Piosette near the Nile, Mitkamr etc. (1820–1826), *Ehrenberg*! Damiatte, *Sieber*! Lower Egypt, *Aucher* 3246! Near springs and streams, Alexandria near Kefed Douar, Dec. 1876, *Letourneux* 80! Birk et Haggar, ancient Iseum near Mansura, March 1877, *Hurst*! Near Hamoul station, Barari, Dec. 1916, *Walsingham* 109! Zagazug, Febr. 1905, *Muschler*! Suez (?) Dec. 1904, *Muschler*!

TROPICAL AFRICA. Egyptian Sudan: about Sennar et Wolet Medine in moist places, March 1839, *Kotschy* 463! Eritrea: Saganeite; Mai Golgol, 2000m., March 1892, *Schweinfurth and Riva* 8511! Sarae; Adi Gana, 1900m., Oct. 1902, *A. Pappi* 59! Abyssinia: Near Adoam, on rivers and in swamps, Nov. 1837, *Schimper* 219! Mettgalo, Addi Abun, at about 2100m., Aug. 1862, *Schimper* 79! Cahira, April 1836, *Schimper* 604! Gondar and vicinity, *R.E. Massey* 5! Zenda, *Steudner* 254! Uganda: Foot-hills of Mount Elgon, about 1600m., marshy land, heads purple, *Small* 1184! Ruchiga, 1700m., Dec. 1903, *Bagshawe* 489! Mpanga Forest, Toro, about 1650m., April 1906, *Bagshawe* 998! Kenya Colony: Londiani, 2300m., damp places, about 45cm. high, *Baker* 354! Limuru, 2300m., herb growing almost in water, 30cm. high, with round heads of purple flowers, June 1918, *Snowden* 572! *Scheffler* 319! Limuru, 2300m., riparian swamps, herb with pink-lilac flowers, Febr. 1915, *Dummer* 1601! Galunka, May 1902, *Kassner* 871! Kukui, June 1902, *Kassner* 991! Nairobi, about 1800m., grassy plain, herb about 50cm. with pink-lilac flowers, Febr. 1915, *Dummer* 1916! Kapte plateau, Masai country, about 2000m., Sept. 1884, *Thomson*! Kikuyu and on road to Eldama Ravine, 1898, *Whyte*! 2nd day's march from Eldama Ravine, 1898; *Whyte*! Tanganyika Territory: Usambara: Kwa Muhesa (?), Aug. 1893, *Holst* 8979! Nyasaland: North Nyasaland, Masuku Plateau, 2000–2200m., July 1876, *Whyte*! Shire, Sept. 1912, *Stewart*!

Abyssinian name: "Chommer".

According to Schimper the natives of Abyssinia make use of this herb for scenting the hair.

12. **S. angustifolius** *DC.* Prodr. 5: 370.

Oligolepis angustifolia Steetz in Peters Mossamb. Bot. 417. *Sphaeranthus Randii* S. Moore in Journ. Bot. 46: 40 (1908). *S. tetraphyllus* S. Moore in Journ. Bot. 54: 254 (1916).

Subtending bracts oblong-lanceolate, mucronate, long-ciliate on the upper margin: ☿ flowers 2, corolla enlarged: ovary small: ♀ flowers 4, subsessile, corolla with 3–4 teeth, slightly enlarged above the ovary; ovary subangular, glabrous glandular.

Tropical Africa. Egyptian Sudan: without locality, 1837, *Kotschy* 500! without locality, medicinal waterplant, Dec. 1862, *Speke and Grant* 714! Bongoland, near Seriba Ghattas in the water of swamp steppes, flowers rose, Sept. 1869, *Schweinfurth* 2378! Niamniamland, swamp east of Flusch River, May 1870, *Schweinfurth* 3748! Mittuland, near Kuraggera, Jan. 1870, *Schweinfurth* 2823! Uganda: Unyoro district, 1300m., July, 1907, *E. Brown* 408! Elgon district, 1905, *E. James*! Kzadanda, near Magigge, 1300m., swamp edge, plant about 45cm. high, flowers lilac-rose, May 1905, *Dummer* 2475! Namanjorgi, 1300m., *Dummer* 2574! Victoria Nyanza region, *Maitland* 188! Kenya Colony: Nairobi, *Dowson* 327! Tanganyika Territory: Msilala, *Hannington*! Nyasaland: Fwambo, 1890, *Carson*! without locality, 1895, *Buchanan* 390! Angoni district, 1901, *J. M. Purves* 93! Plateau near Lake Nyasa, *Thomson*! Shibisia to Tshinmure, 800–1300m., Sept. 1859, *Kirk*! without locality, Sept. 1896, *Cameron* 9! Rhodesia: N'dola, herb in damp places near side of river, Oct. 1906, *C. E. F. Allen* 358! Between Broken Hill zinc mine and Bwana M'cuba copper mine, 1906, *C. E. F. Allen*! Manico district, Umtali division, Odzani river valley, 1915, *A. J. Teague* 403! South Rhodesia; Mazoe district, 1300m., on bank of stream flowing from granite, not very plentiful, flower heads globose, pale purple, Sept. 1906, *Eyles* 405! Makoni district, 1500m., herb in slow moving water, flowers dull purple, June 1917, *Eyles* 805! Salisbury, July 1898, *Rand* 527! Near Salisbury, *O. Craster* 218! Near Salisbury, 1915, *O. Craster*! Marandellao, pre-rain flora, Sept. 1917, *J. A. S. Walters* 2362! without locality, *A. Hislop*!

13. **S. peduncularis** *DC.* Prodr. 5: 370.

S. Dinteri Muschler in Engl. Bot. Jahrb. 46: 107 (1911) ex parte, fide Volkens in Engl. Bot. Jahrb. 53: 368 (1915).

Scales of partial heads 5–7; subtending scale oblong-lanceolate, mucronate, ciliate: ⚥ flowers 2–3, subsessile, with enlarged corolla: ♀ flowers 4–6, subsessile; ovary glandular.

South Africa. Natal: herbaceous in a valley between Umzinkulu River and Umko Mangi River, 1837, *Drège* (type)! Port Natal, 1840, *Krauss* 224! Inanda, June 1879, *J. M. Wood* 346! without locality, *Gerrard* 739!

14. **S. Steetzii** *Oliv. et Hiern* in Fl. Trop. Afr. 3: 334 (1877).

S. angustifolius Schimper iter Abyss. Sect. 2 (1842) No. 525 non DC.

Subtending bract broad, obtuse, shortly mucronate, slightly glandular on the outer back side: ⚥ flower 1, sessile, corolla large, glabrous; ovary short, glandular: ♀ flowers 4–5, subsessile, corolla slender; ovary hairy.

Tropical Africa. Egyptian Sudan: Senaar, *Kotschy* 224! Abyssinia: Near Schire Dschogardi, in abandoned fields. Nov. 1839, *Schimper* 525! without locality (1863-1868), *Schimper* 1349!

15. **S. Talbotii** *S. Moore* in Cat. Talbot Nig. Pl. 56 (1913).

Outer bracts oblong-lanceolate, mucronate, hairy, rugose; subtending bracts of partial heads truncate, slightly mucronate, ciliate: ☿ flower 1, sessile, corolla constricted in the lower part, spongy, glabrous; ovary glandular: ♀ flowers generally 4, stipitate, corolla very slender; ovary glandular and hairy.

Tropical Africa. North Cameroons: Garua to Golombe, 1911, *P. A. Talbot* 1005 (type)!

16. **Sphaeranthus incisus** *Robyns* sp. nov.; affinis *S. angustifolio* DC., sed ramulorum alis incisis atque capillis sparsis totae herbae conspicue differt, accedit quoque *S. pedunculari* sed alis incisis et pedunculo multo breviore differt.

Herba annua, ramosa, pubescens vel glandulosa, ramulis erectis divaricatis conspicue alatis, alis semper profunde incisis, dentibus usque ad 1 mm. longis. *Folia* lineari-lanceolata, apice acuta, plerumque mucronata, basi lata, longe decurrentia, 2–4·5 cm. longa et 3–8 mm. lata, conspicue dentata nervis lateralibus adscendentibus. *Glomeruli* ample ovoideo-globosi, usque ad 8 mm. longi, basi usque ad 1 cm. lati, pedunculati, pedunculis primariis glomeruli saepe alatis, caeteris pedunculis exalatis, usque ad 2 cm. longis, pubescentibus. *Capitulorum bracteae* 5–6; bracteae subtendentes oblongo-lanceolatae, sensim acuminatae, ciliatae et rugosae. *Flores* ☿ 0–2; corolla ampla, interdum superne tenuiter glandulosa, ovario glabro. *Flores* ♀ 4–6, subsessiles, corolla glabra, ovario tenuiter glanduloso et piloso.—*S. neglectus* R. E. Fries in Wiss. Ergeb. Schwed. Rhod.-Kongo Exped. 1: 334 (1916) partim.

Tropical Africa. Angola: near Chihinde, S. Angola, 1250m., Sept. 1899, *Baum* 44 (type)!

South Africa. Transvaal: Komati Poort, Oct. 1901, *J. W. C. Kirk* 80! Lydenburg, between Spitzkop and the Komati river, Aug. 1884, *Wilms* 867! Crocodile river near Louw's Creek, about 300m., Sept. 1886, *Bolus* 1175! Swaziland: without locality, *M. M. Stewart* 18!

17. **S. cotuloides** *DC.* Prodr. 5: 371 (1836).

Scales of partial heads 5–6; subtending bracts oblong-lanceolate, mucronate, very hairy: ☿ flowers 4–5, sessile, corolla with scattered glands on the base and on the top; ovary slender, glabrous: ♀ flowers 8–5, sessile, corolla slender; ovary angular, slightly hairy.

Madagascar. Bombatooke, Mazangay, in moist places, *Bojer* (type)!

18. **Sphaeranthus calcareus** *Robyns* sp. nov.: habitu nana caulibus simplicibus monocephalis, capitulis late ovoideis breviter pedunculatis valde distincta.

Herba annua, erecta, conspicue villosa; caules simplices exalati, usque ad 9 cm. alti basin versus rubescentes. *Folia* sessilia, fere imbricata, lanceolata, apice acuta et mucronata, basi tenuiter constricta, subamplexicaulia, 12–14 cm. longa et circiter 3 mm. lata, subintegra, dense villosa. *Glomeruli* parvi, terminales, solitarii, late ovoidei, usque ad 6 mm. longi, breviter pedunculati, pedunculo exalato circiter 5 mm. longo. *Capitulorum* squamae numerosae, circiter 10; bracteae exteriores lineares, breviter mucronatae, dense ciliatae. *Flores* ⚥ 3–4, corolla ampla, glabra, apice cum glandulis sessilibus, stylo indiviso piloso; flores ♀ 9, sessiles, corolla gracile 2-dentata, ovario breve paene glabro.

Tropical Africa. Angola: Huilla-Humpata: Omaramba, in dry places, in chalk ground amongst the stones, common, July 1883, *Newton in Herb. Johnson* (type)!

19. **S. Stuhlmannii** *O. Hoffm.* in Engl. Bot. Jahrb 20: 230 (1894).

Tropical Africa. Tanganyika Territory: Mamgasai, Unjanguiri (Njanguira), July 1890, *Stuhlmann*.

I have not seen a specimen of this species, but from Hoffman's description it is quite distinct from all others by the position of the compound heads: they are axillary in the upper leaves, solitary or glomerate.

20. **S. epigaeus** *Schinz* in Bull. Herb. Boiss. 6: 560 (1898).

Scales of partial heads 4: subtending bracts broadly obtuse, shortly mucronate, glabrous: ⚥ flowers 1, corolla large, spongy, with scattered sessile glands; ovary long, about $\frac{2}{3}$ the length of the corolla, glandular: ♀ flowers 6–8, sessile, corolla large, ending in a narrow ligula, glandular: ovary hairy.

Tropical Africa. Damaraland: Amboland; Ombalambuenga, 1897, *M. Rautanen* 196 (type)!

Section II. Platycephalae.

21. **Sphaeranthus Lelyi** *Robyns* sp. nov.: affinis *S. nubico* Sch. Bip., sed caulibus foliisque glabris et capitulorum floribus ⚥ et ♀ fere eglandulosis conspicue differt.

Herba annua, erecta, parce divaricato-ramosa, usque ad 40 cm. alta; ramuli tenues, conspicue alati, alis integerrimis, glabris. *Folia* sessilia, lineari-lanceolata, apice breviter rigide mucronata, basi ampla, conspicue et longe decurrentia, 3·5–5 cm. longa et circiter 5 mm. lata, integra, nervis lateralibus paucis, vix distinctis adscendentibus; folia caulina inferiora et media subglabra, summa tenuiter glabriuscula. *Glomeruli* terminales et laterales, cum receptaculo commune omnino

plano. late depresso-globosi, 8 mm. lati et circiter 5 mm. alti, pedunculati; glomerulorum mediorum pedunculus plerumque alatus, caeterum glomerulorum exalatus, 6–12 mm. longus, tenuiter hirsutus. *Paleae* exteriores late obovatae, breviter mucronatae, valde hirsutae. *Capitulorum* squamae 4; bracteae subtendentes angustiores plus minusve truncatae, brevissime mucronulatae et tenuiter ciliatae. *Flos* ⚥ 1, sessilis, corolla ampla, glabra, interdum tenuiter glandulosa, ovario breve tenuiter piloso: *Flores* ♀ 2–6, subsessiles, corolla gracile 3-dentata, basi leviter glandulosa, ovario breve tenuiter piloso et glanduloso.

Tropical Africa. N. Nigeria: Sokoto, *H. V. Lely* 149 (type)! Hausa name: *Fura fura*.

22. **S. nubicus** *Sch. Bip.* ex Steetz in Peters Mossamb. Bot. 418 (1864); Oliv. et Hiern. Fl. Trop. Afr. 3: 335.
Sprunnera alata Schultz Bip. in Kotschy Iter Nub. 209, nomen.
Oligolepis sprunnera Steetz in Peters Mossamb. Bot. 418.

Outer scales of compound heads broadly ovate, abruptly and shortly mucronate, densely hairy; subtending inner bracts smaller, shortly mucronate and ciliate; ⚥ flower 1, corolla large, ovary long, both with numerous scattered sessile red glands: ♀ flowers generally 2 (2–4), shortly stipitate, corolla slender with 3 teeth, ovary long, hairy, both with numerous scattered red glands.

Tropical Africa. Egyptian Sudan: Cordofan, near Cordofan Hogeli, in dry ponds, Oct. 1839, *Kotschy* 209 (type)! West border of Cordofan, Gebel Kagia, Sept. 1875, *Pfund* 356! N.E. Nigeria; Kuka, Febr. 1854, *Vogel* 39!

23. **S. neglectus** *R.E. Fries* in Wiss. Ergeb. Schwed. Rhod.-Kongo Exped. 1: 334 (1916), emend.

Tropical Africa. Eritrea: around Acrur, 1900 m., March 1892, *Schweinfurth and Riva* 1056 (type)!

I have not seen Fries' var. *lanatus*.

24. **S. Fischeri** *O. Hoffm.* in Engl. Bot. Jahrb. 20: 230 (1894).

Outer common scales of compound heads ovate, mucronate, rugose. Partial heads few and small; scales 3, subtending scale truncate and ciliate, no adaxial scale: ⚥ flower 1, sessile, corolla large, quite glabrous; ovary small and glandular: ♀ flowers 2 (sometimes absent in the central partial heads), sessile, corolla slender, 4-toothed, with a few scattered glands; ovary hairy.

Tropical Africa. Kenya Colony: Massaini, *Fischer* 346 (type)!

25. **S. Rogersii** *N. E. Brown* in Kew Bull. 1921: 295.

Outer scales of compound heads oblong-lanceolate, shortly mucronate, ciliate and rugose. Partial heads: scales 5–6, subtending scale truncate, not mucronate, ciliate; ⚥ flower sessile, corolla large, spongy; ovary short, transparent, quite glabrous and without glands: ♀ flowers 4–6, sessile, corolla small, spongy, with 3 teeth; ovary hairy.

TROPICAL AFRICA. North-Western Rhodesia: Mazabuka, 3 July 1920, *F. A. Rogers* 26359 (type)!

Baron 4928 from Central Madagascar may be the same species, but the material is somewhat inadequate to decide the question.

26. **Sphaeranthus madagascariensis** *Robyns* sp. nov.; affinis *S. Rogersii* N. E. Brown, sed ramis numerosis divaricatis, foliis minoribus, pedunculis conspicue alatis, glomerulis valde majoribus conspicue differt.

Herba annua vel suffruticosa, circiter 30 cm. (vel ultra ?) alta, a basi ramosa. *Ramuli* numerosi, divaricati, rotundati, semper alati, praesertim basi brunnei tenuiter pubescentes. *Folia* parva, lanceolata, apice plus minusve acuta, mucronulata, basi ampla, in alas conspicuas undulato-dentatas longe decurrentia, circiter 1 cm. longa et usque ad 5 mm. lata, utrinque villosa. *Pedunculi* numerosi, terminales et laterales, 1·5–2 cm. longi, conspicue alati, alis undulato-dentatis, tenuiter villosi. *Glomeruli* depresso-globosi, leviter peltati, magni, semper 1 cm. diametro, purpurei. *Paleae* exteriores late obovatae, breviter mucronatae, sed mucrone crasso, nervo medio conspicuo, stramineae, hirsutae. *Capitula* propria circiter 4 mm. longa, exteriora circiter 6-squamata, truncata, interiora circiter 4-squamata. *Bracteae* subtendentes plerumque minutissime mucronatae, ciliatae, apicem versus rubrae. *Flos* ⚥ 1 (interdum absens in capitulis exterioribus) sessilis, corolla ampla, glabra, stylo indiviso minute denticulato, ovario breve glaberrimo. *Flores* ♀ in capitulis exterioribus circiter 8, in capitulis mediis 4, subsessiles, corolla tenue 3-dentata ovario leviter angulare subglabro.

MADAGASCAR. North West Madagascar, without locality, *Baron* 5503 (type)!

Subgenus II.—**Eusphaeranthus.**

Section III.—CYLINDROCEPHALAE.

27. **S. ukambensis** *Vatke et O. Hoffm.* in Engl. Bot. Jahrb. 20: 228 (1894).

S. stenostachys Chiov. Result. Sci. Miss. Stefan.-Taoli, Somali Ital. 1: 102 (1916) ex descriptione.

Scales of partial heads 10–12, small, oblanceolate, shortly acuminate and ciliate: ⚥ flowers 2, corolla large, ciliate and glandular; ovary short and glabrous: ♀ flowers 8–10, sessile, corolla slightly enlarged above the ovary, 2-toothed; ovary glabrous.

Tropical Africa. Kenya Colony: Ukamba; Adi river, in moist places, March 1877, *Hildebrandt* 2612 (type)! Massai Reserve: Southern Guaso Myero River, *Mrs. Dowson* 727! From N. end of Lake Rudolf to Barco, March 1910, *N. C. Cockburn*! Lake Rudolf, *Capt. M. S. Wellby*! Tanganyika Territory: Irangi, *Fischer* 566!

28. **Sphaeranthus variabilis** *Robyns* sp. nov.; affinis *S. ukambensi* Vatke et O. Hoffm., sed glomerulis oblongis vel late ellipsoideis nec elongatis cylindricis, pedunculis alatis et capitulis propriis paucioribus, conspicue differt.

Herba annua vel suffruticosa valde ramosa, usque ad 50 cm. alta, undique plus minusve tomentosa; ramis conspicue alatis rotundatis. *Folia* sessilia, oblongo-lanceolata, apice obtuso-mucronata, basi amplexicaulia et in alas profunde inciso-dentatas saepe spinulosas longe decurrentia, 1·5–3 cm. longa et usque ad 1 cm. lata semper dentata, dentibus plerumque spinulosis, penninervia, nervis lateralibus leviter adscendentibus plerumque vix distinctis. *Glomeruli* numerosi, variabiles, oblongi usque ad late ellipsoidei, usque ad 1·3 cm. longi et circiter 5-6 mm. diametro, receptaculo commune elongato cavoque, distincte pedunculati; pedunculi usque ad 2 cm. longi, alati, alis inciso-dentatis plerumque etiam spinulosis. *Capitulorum* squamae circiter 13, quarum tres semper exteriores graciles, lineari-lanceolatae, 2 mm. longae, longe apiculatae et conspicue ciliatae; squamae interiores ampliores lineari-lanceolatae, emucronatae et ciliatae. *Flores* ⚥ 2–3 pro capitulo, corolla ampla, glabra, interdum sub limbi dentibus tenuiter glandulosa, ovario gracile sterileque. *Flores* ♀ circiter 8, sessiles, corolla gracile, 2-dentata, glabra, ovario fertile tenuiter piloso.

Tropical Africa. Nyasaland: Mpassu, Oct. 1887, *Scott* (type)! Without locality, 1891, *Buchanan* 1027! *Buchanan* 1101! North Rhodesia: Boruma, May–July 1891, *Menyhart* 787! Portuguese East Africa: Shigogo, sand bank, June 1859, *Kirk*! near Senna, July 1859, *Kirk*!

29. **S. sphenocleoides** *Oliv. et Hiern* in Fl. Trop. Afr. 3: 333 (1877).

S. microcephalus Vatke in Oesterr. Bot. Zeitschrift, 1875: 326, non Willd.

Partial heads large and short with 6-8 scales, truncate, emucronate, ciliate; ⚥ flowers 1–3, corolla broad, consistent, with spreading large teeth; ovary angular, hairy and slightly glandular: ♀ flowers 20–35, sessile, corolla large, consistent in the lower part, constricted into a slender tube, 3-toothed in the upper part; ovary glandular.

Tropical Africa. Zanzibar Island, in marshy places, Oct. 1873, *Hildebrandt* 1021 (type)!

This species is so closely allied to *S. africanus* that it may be only a form of that species. The broadly ellipsoid heads of

S. sphenocleoides are found in *S. africanus;* see especially Malay Peninsula; Setul, *Ridley* 14904! which is probably *S. africanus*.

Section IV.—*Sphaerocephalae.*

30. **Sphaeranthus confertifolius** *Robyns* sp. nov.; affinis *S. africano* Linn., sed ramulis foliisque dense puberulis, foliis multo minoribus confertis et crassis distincte differt.

Suffruticosa, basi lignescens, ramosa, usque ad 30 cm. alta, undique dense puberula; ramuli breves, anguste alati, alis subintegris. *Folia* parva, sessilia, conspicue conferta, oblanceolata, apice subacuta, basi paullo angustiora, in alas decurrentia, circiter 1 cm. longa et 4 mm. lata, subintegra, nervis lateralibus indistinctis, crassa, callosaque. *Glomeruli* pauci, praecipue terminales, spherico-globosi, circiter 8 mm. diametro, pedunculati, pedunculis circiter 5 mm. longis alatis et costatis. *Capitula* propria pauca, amplissima; squamae circiter 13 quarum 3 exteriores sed interioribus leviter dissimiles; omnes obovato-lanceolatae, leviter cucullatae, breviter calloso-mucronulatae (exteriores cum mucrone vix longiore), ciliatae, dorso apicem versus rugosae. *Flores* ⚥ 5–7, corolla ampla, apicem versus cum glandulis sessilibus, ovario glabro; flores ♀ circiter 30, sessiles, corolla tenue 3-dentata, glaberrima, ovario angulare glabro.

Tropical Africa. Kenya Colony: Nairobi, at about 1700 m., outskirts of golf-course, about 30 cm. high, flowers lilac-rose, Febr. 1915, *Dummer* 1976 (type)!

31. **S. africanus** *Linn.* Sp. Pl. 1314.

S. africanus et *S. microcephalus* Willd. Sp. Pl. 3: 2395. *S. microcephalus* et *S. glaber* DC. Prodr. 369, 370. *S. indicus* Kurz in Journ. As. Soc. 2: 183 (1877). *S. africanus* Wall. Cat. 3179 A-H. *S. Hildebrandtii* Baker in Journ. Linn. Soc. 25: 326 (1890).

Partial heads large; scales 9 to each separate head, 3 outer scales oblong-lanceolate, mucronate, glabrous, 6 inner scales truncate, shortly mucronate, glabrous: ⚥ flowers 2–3, corolla large, consistent, with scattered glands; ovary as long as the corolla, angular, glandular: ♀ flowers about 20-22, sessile, corolla large, contracted in a slender 3-toothed tube in the upper part; ovary glandular.

Distribution.—Recorded from Madagascar (but not yet from Africa proper), India (Ceylon, Madras, Bombay, Bengal, Burma), Siam, Cochin China, Hainan, Malay Peninsula and Archipelago, and N. Australia.

I have not seen a specimen of *S. erectus* Zoll. & Mor. (Nat. en Geneesk. Arch. Voor. Neerl. Ind. 2: 233, 1845) from Java, and from description it may be the same as *S. africanus*, which occurs in Java, and of which specimens from Zollinger's herbarium are at Kew.

32. **S. angolensis** *O. Hoffm.* in Engl. Bot. Jahrb. 20 : 228 (1894).

Scales of partial heads about 10, lanceolate, mucronate and ciliate : ⚥ flower 1, sessile, corolla large, long-toothed, glabrous ; ovary very slender ; ♀ flowers 15–17, sessile, corolla bottle-shaped, broadly enlarged above the ovary and finally contracted in a long slender tube, with 3 teeth, glabrous ; ovary angular, hairy.

Tropical Africa. Angola : on the dried-up mud of the lakes along the river Lifune, near Libongo, Aug. 1858, *Welwitsch* 3509 (type) ! *Welwitsch* 3508 ! Belgian Congo : Stanley-pool, about 300 m. in moist places, procumbent, up to 50 cm. high, July 1888, *Hens* 79 ! Bokala, July 1914, *Vanderyst* 4819 ! Around Leopoldville, Aug. 1902, *Gillet* ! Between Leopoldville and Mambagi, 1902, *Gillet* 2523 !

33. **S. indicus** *Linn.* Sp. Pl. 1314.

S. hirtus Willd. Sp. Pl. 3 : 2394 et 2395 ; *S. hirtus* et *S. mollis* DC. Prodr. 5 : 369 ; *S. hirtus* Kurz in Journ. As. Soc. 2 : 283 (1877), et 3179 B.C. ; *S. ovalis* Steetz in Peters Mossamb. Bot. 413 (1863). *S. mossambiquensis* Steetz l.c. 421.

Scales of partial heads about 10, linear-obovate, slightly mucronate, ciliate : ⚥ flowers 2–3, corolla large, consistent in the lower half, constricted below the 5 teeth, style undivided ; ovary angular, glabrous : ♀ flowers 12–16, subsessile, corolla enlarged above the ovary, with 2 teeth, glabrous.

Distribution.—Recorded by numerous specimens from Ceylon, Madras, Bombay (*Ritchie* 410), China (*Henry* 123), Java (*Zollinger* 548), N. Australia, Kenya Colony (*Dummer* 1943, *Dowson* 510, *Whyte*), Delagoa Bay (*Schlechter* 12084), and Madagascar (*Hildebrandt* 3423).

34. **S. senegalensis** *DC.* Prodr. 5 : 370.

S. hirtus Oliv. & Hiern Fl. Trop. Afr. 3 : 334, non Willd. *S. indicus* Hooker Fl. Brit. Ind. 3 : 275, non Linn.

Scales of partial heads about 12, linear-oblong, the outer mucronate, the inner emucronate, all ciliate : ⚥ flowers 3–4, subsessile, corolla large, spongy in the lower half, not spongy and glabrous in the upper ; ovary glabrous : ♀ flowers generally 9, sessile, corolla enlarged above the ovary, with 2 teeth, style bifid ; ovary angular, slightly hairy.

Tropical Africa. Cape Verde Peninsula : *Brunner* 113 ! Senegambia : *Heudelot* 771 ! *Roger* ! *Farmer* 130 ! Gambia : *Ozanne* 6 ! *Brown-Lester* 2 ! 8 ! N. Nigeria : Kontagora, *Dalziel* 189 ! N.W. Rhodesia : Mazabuka, *Rogers* 26360 !

India. Numerous specimens from N.W. India, Bengal, Burma, Assam, Siam (*Kerr* 1666, *Vanpruk* 465).

From the rather meagre descriptions, *S. Lecomteanus* O. Hoffm. et Muschler in Bull. Soc. Bot. Fr. 57 : mem. 8 : 114 (1910) ; *S. ovalifolius* Muschler in Engl. Bot. Jahrb. 46 :

107 (1911) and *S. Engleri* Muschler, l.c., 108, appear to belong to this species.

35. **S. flexuosus** O. Hoffm. ex Wildem. in Ann. Mus. Congo, Ser. iv. p.x.

Scales of the partial heads about 18, the outer ones about 9, slender, oblanceolate, acute, constricted in the lower part, broadened above, long-ciliate (fimbriate-plumose) and aristate: ⚥ flowers 2; ♀ flowers about 10; ovary hairy; corolla broadened at the base.

Tropical Africa. Belgian Congo: Katanga; around Lukafu, flowers blue, Oct. 1899, *Verdick* 107 (type)!

36. **Sphaeranthus Brounae** *Robyns* sp. nov.; affinis *S. senegalensi* DC., sed ramulis peduncul isque exalatis; foliis integris pilosis, glomerulis minoribus valde differt.

Herba annua, erecta, usque ad 30 cm. alta, ramosa, undique molliter pilosa et obscure glandulosa; ramuli viridescentes, leviter costati exalati. *Folia* sessilia, parva, oblanceolata, apice obtusa et mucronata, basi ampla, cordata et conspicue amplexicaulia, brevissime decurrentia; folia inferiora usque ad 2 cm. longa, basi usque ad 1 cm. lata, folia superiora circiter 1 cm. longa et 4 mm. lata, omnia integra. *Glomeruli* numerosi, spherico-globosi, circiter 7 mm. diametro, conspicue pedunculati, pedunculis exalatis usque ad 1·5 cm. longis. *Capitulorum* squamae circiter 10, lanceolatae, longe ciliatae, apicem versus tenuiter glandulosae. *Flores* ⚥ plerumque 3, sessiles, corolla basi ampla spongiosaque medio tenuiter constricta apice glandulosa, stylo apice leviter bifido, ovario angulare glabro; flores ♀ circiter 9, sessiles, corolla tubulosa, basi ampla 4-dentata, stylo conspicue bifido, ovario rotundato pilosoque.

Tropical Africa. Egyptian Sudan: Cordofan; near Agari in dried bed of a pool, herb 30 cm. high, strongly scented, *Mr. and Mrs. A. F. Broun* 845 (type)!

37. **S. humilis** *O. Hoffm.* in Warb. Kunene-Zambesi Exped. 410 (1903).

S. tenuis et *S. setulosus* R. E. Fries in Wiss. Ergeb. Schwed. Rhod.-Kongo Exped. 1: 333 (1916).

Scales of partial heads 4–9, slender, linear-lanceolate, slightly mucronate and ciliate: ⚥ flower 1, corolla large, with pilose lobes, style undivided, hairy; ovary slender, glabrous: ♀ oowers 4–5, corolla slender, glabrous, style slightly divided at the top; ovary round, glabrous.

Tropical Africa. Angola: between Goudkoppe and Kakele in sandy soil at edge of stream, 1210 m., fl. Oct. 1899, *Baum* 184 (type)! North Rhodesia: Chibanga, 20 m. N. of River Kafue, 1000 m., in loamy soil, Oct. 1909, *Rogers* 8532! Broken Hill, 1300 m., sandy soil, July 1909, *Rogers* 8337! Between Broken Hill zinc mine and Bwana M'cuba, aromatic herb. Oct. 1906, *C. E. F. Allen* 293 ! Bechuanaland : about 1100 m., *Em. Holub* !—The following specimen may belong here : Rhodesia, Tesheke district, *Miss A. E. Gairdner* 134 !

38. **S. polycephalus** *Oliv. et Hiern* in Fl. Trop. Afr. 3 : 333 (1877).

S. hirtus T. Thoms in Speke Journ. App. p. 637, non Willd.

Scales of partial heads 7–10, small, oblanceolate, mucronate and ciliate above : ⚥ flower 1, corolla large, glabrous, with a very few glands in the upper part ; ovary angular, slightly hairy : ♀ flowers 3–4, sessile, corolla small, with 3 teeth ; ovary slightly hairy.

TROPICAL AFRICA. Tanganyika Territory : Usangara Zungomero, in thick tufts on dried up swamps near rice fields, flowers purple, Oct. 1860, *Speke et Grant* (type) !

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(1) Vaill. in " Act. Gall." 1719 : t. 20, f. 12.
(2) Linn. Sp. Pl. 926 (1753).
(3) DC. Prodr. 5 : 369 (1836).
(4) Steetz in Peters Mossambique Bot. 411 (1862–4).
(5) Wight Ic. Pl. Ind. Or. 3 : t. 1149 (1846).
(6) Oliv. Fl. Trop. Afr. 3 : 332 (1877).
(7) O. Hoffm. in Engl. Bot. Jahrb. 20 : 227 (1895).
(8) Muschler in Engl. Bot. Jahrb. 46 : 105 (1911).

XXII.—NEW ORCHIDS : DECAS L.

The following four species of *Pleurothallis* (Nos. 491–494) flowered at Kew in the late autumn and winter, and all belong to Lindley's section *Macrophyllae fasciculatae* and are of close affinity. They are therefore closely related to *P. linguifera* Lindl., *P. cardiothallis* Reichb., *P. cardiostola* Reichb. and *P. tridentata* Klotzsch. The last is, however, considerably smaller, both in leaf and in flower.

491. **Pleurothallis cardiocrepis** *Braid* ; affinis *P. linguiferae* Lindl. (§Macrophyllae fasciculatae), sepalis dorsalibus angustioribus, labellis angustioribus ovatisque differt.

Caules secundarii elongati, erecti, monophylli, circiter 16 cm. longi, 1·5 mm. diametro, prope basim paucivaginati. *Folium* carnosum, profunde cordatum, apicem versus leviter attenuatum et tridentatum, dente intermedio cuspidato, 8·5 cm. longum, 3·5–5 cm. latum. *Flores* fasciculati ; pedicelli breves, 5 mm. longi ; ovarium circiter 4 mm. longum. *Sepala* lateralia usque ad apicem cohaerentia, plana, ovata, obtusa, pallide viridia, 6 mm. longa, 5 mm. lata ; sepalum dorsale ligulatum, 6 mm.

ongum, 3 mm. latum, pallide roseum. *Petala* linearia, ovata, acuta, 4 mm. longa, 1 mm. lata, rosea, ad basim ciliata. *Labellum* carnosum, ovatum, obtusum, ciliatum, 3 mm. longum, 2 mm. latum, roseum. *Columna* carnosa, superne dilata.

Habitat unknown.

This plant (No. 40 87) was received in 1887 from Mr. B. S. Williams as *P. tridentata*. It has been known at Kew for a number of years as *P. cardiocrepis*, but no description appears to have been published. It is an exceptionally free flowering plant, and two or three flowers often open on the same leaf together. The flowers are small and of a greenish tint largely suffused with rose. The latter colour predominates on the posterior sepal, petals and lip. There are sparse, indistinct serrations on the dorsal sepal, and fringes on the lip and petals, and the column is green spotted with rose. The venation is very indistinct until the flower is dry.

492. **Pleurothallis carnosa** *Braid*; affinis *P. linguiferae* Lindl. (§Macrophyllae fasciculatae) sed forma sepalorum, petalorum labellorumque differt.

Caules secundarii elongati, erecti, monophylli, circiter 8–9 cm. longi, 2 mm. diametro, prope basim parum vaginati. *Folium* carnosum, oblongo-cordatum, demum obtusum, cuspidatum, 7–8 cm. longum, 2–3·5 cm. latum. *Flores* ex folia fasciculati; pedicelli abbreviati; ovarium circiter 3 mm. longum. *Sepala* lateralia fere usque ad apicem cohaerentia, ovato-lanceolata, bifida, 10 mm. longa, 4 mm. lata; sepalum dorsale lanceolatum, acutum, 10 mm. longum, 1 mm. latum. *Petala* lineari-lanceolata, obtusa, 6 mm. longa, 1 mm. lata. *Labellum* carnosum, oblongo-ellipticum, obtusum, subtiliter tuberculatum, 6 mm. longum, 3 mm. latum. *Columna* carnosa.

Habitat unknown.

The history is not known. It has been cultivated for many years at Kew.

The leaves are of a brownish-green colour when young, but later become reddish-green. This may be due to cultural conditions. The flower itself is of a reddish-brown colour with a dull red lip. At Kew this orchid flowers in the late autumn and winter, and when the light is poor the colour fails to develop. The lip possesses one central channel and is minutely tubercled and keeled beneath at the apex. The dorsal sepal is provided with three nerves, the petals with one each and the lateral sepals with two distinct and two obscure nerves. The nervation is distinctive, but barely visible in the living state. The lateral sepals are not completely united, being free for less than 1 mm. at the apex.

493. **Pleurothallis fuscata** *Braid*; affinis *P. linguiferae* Lindl. (§Macrophyllae fasciculatae) sed forma sepalorum labellorumque, nervis sepalorum differt.

Caules secundarii elongati, erecti, monophylli, circiter 22 cm.

longi, 1·5 cm. diametro. viridi-rosei, prope basim parum vaginati; vagina punctata. *Folium* carnosum, cordatum, attenuatum, apice tridentatum, 7 cm. longum, 3·5–4 cm. latum. *Flores* ex foliis fasciculati; pedicelli abbreviati, circiter 5 mm. longi; ovarium 9 mm. longum. *Sepala* lateralia fere ad apicem cohaerentia, leviter bifida, plana, ovata, obtusa, ciliolata, 12 mm. longa, 7 mm. lata; sepalum dorsale lanceolatum, acutum, ciliolatum, 12 mm. longum, 6 mm. latum. *Petala* lineari-lanceolata, acuta, ciliata, 7 mm. longa, basi 1 mm. lata. *Labellum* carnosum, tuberculatum, ligulatum, obtusum, subtiliter tuberculatum, ciliatum, infra apicem carinatum, roseum, 6 mm. longum, 4 mm. latum. *Columna* carnosa, dilatata.

Habitat unknown.

The plant (No. 538/85) was received in 1885 from Messrs. Shuttleworth, Carder & Co. Two years later it was figured for the Kew collection of drawings, and although it has flowered freely since it has not been identified or the place of origin discovered.

In colour the flowers are greenish-yellow suffused with red along the veins of the sepals and petals. The sepals are indistinctly ciliated or acutely serrated. The lip is liver coloured and the base is pressed closely against the column and is slightly channelled down the centre, while the apex possesses a slight thickening underneath. Except in the dried state the nerves on the sepals are not very distinct.

494. **Pleurothallis nervosa** *Braid*; affinis *P. linguiferae* Lindl. (§Macrophyllae fasciculatae), sepalis dorsalibus petalis labellisque angustioribus, forma sepalorum lateralium differt.

Caules secundarii elongati, monophylli, circiter 11 cm. longi, 1–5 cm. diametro, prope basim parum vaginati. *Folium* carnosum, cordato-ovatum, acutum, 7 cm. longum, 2·5 cm. latum. *Flores* ex basibus foliorum fasciculati; pedicelli abbreviati, circiter 1 cm. longi. *Sepala* lateralia usque ad apicem cohaerentia, plana, ovata, acuminata, obtusa, circiter 10 mm. longa, 5 mm. lata; sepalum dorsale oblongo-lanceolatum, breviter acuminatum, obtusum, 9 mm. longum, 2 mm. latum. *Petala* linearia, lanceolata, obtusa, 5 mm. longa, circiter 1 mm. lata. *Labellum* carnosum, oblongum, acuminatum, obtusum, roseum, circiter 4 mm. longum, 1·5 mm. latum. *Columna* carnosa.

CENTRAL AMERICA. Costa Rica: Cachi District; at 4000 to 5000 feet elevation, *Lankester*.

The plant (No. 516/13) was received from Mr. C. H. Lankester in 1913, but did not flower until December 1923. Vegetatively it agrees very well with *P. fuscata* and the colouring of the flowers is similar, though the details of structure are distinct. The flowers are reddish-greenish-brown with a darker, red lip. When dry five nerves are visible on the posterior sepal and three of these run into the apex, making a slight hood. The petals each possess one vein. The union of the lateral sepals

gives rise to a kite-shaped structure possessing three indistinct nerves about the centre and two more pronounced, one on either side, 7 in all. Frequently the flower fails to develop and remains stunted and of a pale greenish or greenish-brown colour.

495. **Bulbophyllum caesariatum** *Ridley*; affinis *B. penicillio* Par. & Reichb. f., sed pilis rhachidium florumque et floribus remotis differt.

Pseudobulbus ovoideus, globosus, 13 mm. longus et latus. *Folium* coriaceum oblongum, lanceolatum ad petiolum attenuatum, apice dispariter bilobum, lobo longiore acuto, 15 cm. longum, 2–5 cm. latum; petiolus 2·5 cm. longus. *Scapus* tenius, 23 cm. longus, nudus praeter bracteas 3 remotas. *Racemus* laxus, pilosus, circiter 25-florus. *Bracteae* lanceolatae, 13 mm. longae, acuminatae, apice setaceo 2·5 mm. longo. *Flores* viridi-albi; pedicelli crassi, pilosi, 12 mm. longi. *Sepala* ovata, basi gibbosa, pilis longis semi-pellucidis obtecta. *Petala* sepalis dimidio breviora, lanceolata, obtusa, pilosa, 6 mm. lata, pilis apiculata. *Labellum* linearum, oblongum, obtusum, carnosum, probabiliter purpureum, medio canaliculatum, sub labello et margine pilosum. *Columna* glabra, brevis, lata; alae ovatae cuspido longo.

INDO-CHINA. Lower Siam; Kopah Jan-Jan, *Mohammed Haniff*.

Allied to *B. penicillium* of Burma, but the flowers and rachis are more hairy and the flowers more distant.

496. **Ione purpurata** *Braid*; affinis *I. flavescenti* Rolfe, sed sepalis patentibus et colore et magnitudine differt.

Rhizoma repens, subgracile. *Pseudobulbi* subdistantes, ovoidei vel ellipsoideo-ovoidei, 1–2 cm. longi, 1–2 cm. diametro, monophylli. *Folia* angusti-oblonga, subacuta, coriacea, apice subrecurva, circiter 3 cm. longa, 0·5 cm. lata. *Scapi* laterales, breves, circiter 2 cm. alti, 1–2-flori. *Bracteae* ovato-oblongae, subacutae, scariosae, 6–7 mm. longae. *Sepalum* dorsale ovato-oblongum, subacutum apice subrecurvum, 8 mm. longum; sepala lateralia, subpatentia, lanceolato-ovata, acuta, navicularia, 8 mm. longa. *Petala* patentia, lineari-oblonga, subobtusa, 7 mm. longa, basi latiora et ciliata, apice et margine carnosa. *Labellum* subcarnosum, 6–7 mm. longum, basi suborbiculare subconcavum, apice lineari-oblongum, angustum et subobtusum. *Columna* 2 mm. longa et lata. *Pollinia* 4.

INDO-CHINA. Siam: *Kerr*.

This orchid possesses close affinities in *Ione Anderseni* King et Pantl. and in *Ione flavescens* Rolfe. It is distinguished easily by its size, the spreading sepals and petals and its colour. The lateral sepals are markedly boat-shaped and are slightly connate. The slightly fleshy petals with reddish-purple tips, and the labellum of similar colour, show up clearly against the pale creamy green of the sepals. In the specimen forwarded the

elastic caudicle had contracted and the gland adhered to the column so that the exact position of these could not be determined. It was clear, however, that the arrangement was as in *I. Andersoni* except that it appeared that the two caudicles were distinct and not united. The remains of membranous sheaths adhered to the pseudobulbs and the base of the peduncle. The rhizome was about 2 mm. in diameter.

The orchid flowered in Trinity College Gardens, Dublin, in May, 1923, and was forwarded to Kew for determination by Professor H. H. Dixon. It was collected in Siam by Dr. Arthur Kerr.

497. **Eria Brownei** *Braid*; affinis *E. alba* Lindl. sed pseudobulbis multo majoribus et planta multo major differt.

Pseudobulbus efoleatus ovoideo-oblongus, erectus pauciarticulatus, leviter arcuatus, circiter 12 cm. altus; pseudobulbus foliatus, erectus, cataphyllis vestitus, apice 5-foleatus. *Folia* elongato-lanceolata, acuta, basi attenuata, circiter 9-nervia, subtenera circiter 18 cm. longa, 2 cm. lata. *Scapi* 1–3 suberecti, graciles, circiter 8–10 cm. longi, subpubescentes; racemi multi et sublaxiflori. *Bracteae* saepe recurvae, ovato-oblongae, subacutae quam ovaria aequales. *Sepalum* porticum, recurvum, oblongum, obtusum, 0·7–1 cm. longum, 3-nervium; sepala lateralia oblique ovata, subobtusa parva, recurva, 3–4-nervia, 8–10 mm. longa. *Petala* patentia, lanceolata, subacuta, 7–9 mm. longa. *Labellum* 3-lobum, 4–5 mm. longum, apice valde recurvum; lobi laterales erecti, semiovati, acuti; lobus intermedius oblongus, obtusus; calli lamellae formes in disco subparalleli, discus antice saepe tuberculatus. *Columna* brevis, circiter 3·5 mm. longa. *Pollinia* anguste pyriformia. *Mentum* obtusum, 4 mm. longum.

BURMA. Chin Hills, *Browne*.

This orchid at first sight suggests a large variety of *E. alba* Lindl., but the pseudobulbs are much larger and of a different build and the whole plant is more robust and floriferous. The pseudobulbs resemble those of *E. bractescens* Lindl. and are slightly curved and flattened and possess the long markings also seen in *E. excavata* Lindl. The sheathing scales of the young bulbs are large and imbricated and are about six in number. The ovaries are practically sessile and distinctly but not very hairy, and downiness is scarcely visible to the naked eye on the scape and exterior of the sepals. The petals bend slightly forward and are limper than the recurved sepals. The lip possesses a strongly recurved front lobe and erect side lobes. The exceedingly fragrant flowers are waxy white except for the lip and anther. The base of the lip is white; the side lobes are marked with reddish-purple and the apex is yellow. The anther is also marked with reddish-purple. Besides the two distinct calli on the base of the lip there is the suggestion of a median one and a semicircle of tubercles on the anterior lobe.

The Orchid is dedicated to Major St. John A. Browne, who collected it in the Chin Hills. He forwarded it to his father, Lt.-General Sir Arthur G. F. Browne, Lower Bourne, Farnham, in whose collection it flowered in May, 1923, when it was forwarded for identification to Kew.

498. **Eria citrina** *Ridley*; affinis *E. Sonkaris* Reichb. f., floribus multo minoribus, formis labellorum distincta.

Caules plures, erecti, validi, 28–56 cm. longi, 1 cm. lati. *Folia* coriacea, oblonga, apicibus inaequaliter bilobis obtusis, nervis siccitate conspicuis, 14 cm. longa, 3 cm. lata, basi in petiolo 1 cm. longo angustata, vaginis applanatis 7 cm. longis. *Racemi* 2 vel plures, terminales, 14 cm. longi, densi flori, *Bracteae* lanceolatae, acuminatae, acumine longo reflexae, 4 mm. longae. *Pedicelli* 5 mm. longi, albo-tomentosi. *Sepalum* posticum spathulato-cymbiforme, 3 mm. longum; lateralia triangulari-obovata omnia pallide citrina extus albotomentosa. *Petala* breviora, glabra, spathulata, lanceolata, pallide citrina. *Labellum* late obovatum, 5-lobum, 5 mm. longum, lobis lateralibus latis falcatis subacutis citrinis punctis pallide rubris prope margines et apicem, epichilio bilobo, lobis oblongis lateralibus haud superantibus; in pagina interiore loborum lateralium 2 lobulis linearibus acutis, in medio labelli fusci elevato crasso flava ad apicem producto et clavato marginibus crenulatis. *Columna* brevis, crassa, pede longo canaliculato. *Anthera* ovata, citrina. *Stigma* transversim oblongum angustum.

MALAYA. Borneo: Pontianak.

Mr. Ridley states that he got this pretty *Eria* from a native orchid dealer at Singapore in 1893, but never described it. It is now represented in the Royal Gardens, Kew, by a plant collected by Mr. Mohammed Haniff at Gunong Korban in Perak and forwarded to Kew in 1910. The plant has been referred by J. J. Smith and R. A. Rolfe to *E. Sonkaris* Reichb. fil., a native of Sumbawa, of which there is a type specimen in the Lindley Herbarium, but which is a totally different species with flowers not half the size.

499. **Spiranthes** (§ Euspiranthes) **Pamii** *Braid*; affinis *S. alpinae* Rodr. et *S. bicolore* Lindl. sed labellis valde distincta.

Caulis elongatus, aphyllus, subsparse vaginatus, superne brevissime et densiuscule pubescens viridis, 15–25 cm. altus. *Folia* ovata vel lanceolata, apice acuto solido, membranacea, 6–11 cm. longa, 3–4 cm. lata; petiolus circiter 3 cm. longus. *Inflorescentiae* secundiflorae, virides; bracteae lineari-lanceolatae, carnosae, trinerviae, pubescentes, floribus subaequilongis, virides, circiter 1–3 cm. longae. *Ovarium* oblongum, densiuscule pubescens, viridi-carnosum, 5–8 mm. longum. *Sepalum* dorsale anguste ovatum, apice rotundatum, uninervum, atro-viride, pubescens, fere ad apicem petalorum adnatum, 3 mm. longum, 2 mm. latum; *sepala* lateralia linearia, carnosa, subfalcata, apice subacuta, glandulosa, basi pubescentia, medio glandulosa pubescentia, 6 mm. longa, 1–5 mm. lata. *Petala* linearia, uninervia apice rotundata, sepalo dorsali adnata, 5 mm. longa, 1 mm. lata. *Labellum* viride et album, basi inflatum, 0–8 cm. longum; hypochilium lineare dilatatum, leviter inflatum, viride, extus pilosum, columno adnatum; mesochilium lineare ad basim columnae adnatum; epichilium album, pilosum, trilobum, abrupte valde dilatatum, marginibus crenulatis saepe recurvis, 3 mm. longum, 5 mm. latum; lobus lateralis reniformis; lobus medius amplus serratus, saepe triserratus. *Columna* brevissime viridis. *Pollinia* 2–3 mm. longa.

Var. **bruneolus** var. nov. Typo similis sed caules, vaginae, bracteae, ovaria, sepala et petala brunnescentes. Labellum album, nervo medio brunnescente.

Var. **spiralis** var. nov. Typo similis sed inflorescentia nunquam secunda.

Var. **brevipetiolatus** var. nov. Typo similis sed vix petiolatus vel petiolus brevis; folium saepe ad 15 cm. longum, et ad 6 cm. latum.

ARGENTINE REPUBLIC. Buenos Aires.

The plant resembles *S. alpina* Rodr. or *S. bicolor* Lindl., but the lip is quite distinct. The apex of the lip is pure white with one central green vein. The other six veins are confined to the region of the hypochile and mesochile. The dark green of the dorsal sepal contrasts strongly with the almost flesh colour of the lateral sepals, ovary and bract. The petals are a greenish-brown edged on the outer side with white, and possessing a central brown nerve. The stem and sheaths are usually green, but often a variety occurs suffused with a flesh-like colour. The plant was found at Buenos Aires and forwarded to Kew by Major A. Pam in 1923. It flowered in 1924.

Over 30 were in flower together, so it was possible to note three of the forms which vary from the type specimen. These are :—

Var. **bruneolus,** which possesses stems, sheaths, bracts, ovaries, sepals and petals suffused with a brownish colour (Ridgway's Colour Standards, Plate xxx, No. 21″ i.).

Var. **spiralis,** which differs from the type in not possessing all secund flowers; the flowers are more or less in a normal spike.

Var. **brevipetiolatus,** which differs from the type in its petioles being short or wanting.

500. **Stenorrhynchus bonariensis** *Braid*, comb. nov. *Spiranthes* (§ Stenorrhynchus) *bonariensis* Lindl., Gen. & Sp. Orch. 475—descr. emend.

Folia circiter 4, epetiolo basi vaginante angustata, deinde oblongo lanceolata, acuta, apiculata, ad 27 cm. longa, ad 4 cm. lata, tenuiter plurinervia, intense viridia. *Caulis* cum inflorescentia ad 55 cm. altus, 4–5 mm. latus, basi foliatus, infra leviter pilosus supra villosus, circiter 4-vaginatus; vaginae lanceolatae, acutae, 6–10 cm. longae, supra glabrae, glandulesae, ciliatae, infra pilosae. *Spica* densiuscula 6–15 cm. longa, circiter ad 25-flora. *Bracteae* 2–3 cm. longae, 0·8 cm. latae, erectae, lanceolatae, acuminatae, pubescentes. *Pedicellus* brevis (1–3 mm.), albus; ovarium villosum, 12 mm. longum. *Sepalum* dorsale oblongo-lanceolatum, cuculatum, pilosum, obtusum, 15–18 mm. longum, 10 mm. latum; sepala lateralia elliptico-falcata, concava, obtusa, depressa, villosa, 15–20 mm. longa, 5 mm. lata; sacculum, villosum 5 mm. longum, 4 mm. latum. *Petala* glabra, obtusa, crenata, ad sepalum dorsale adnata, 15 mm. longa, 3 mm. lata. *Labellum* circiter 20 mm. longum, 10 mm. latum; hypochilium cum 2 callis in saccis, intus pilosum; mesochilium obovatum, carnosum, flavum, glandulosum, concavum, ad columno adnatum; epichilium obcordatum cum mucro in sino, glandulosum, album et viride, margine crenulatum, recurvum. *Columna* alata, 16 mm. longa, 5 mm. lata, glabra, sub stigma lanuginosa; rostellum longum, obtusum. *Anthera* parva, membrana, 4 mm. longa, 2 mm. lata. *Pollinia* adnata, falcato-clavata, farinosa; glandula fere caerulea.

ARGENTINE REPUBLIC. Buenos Aires.

The noteworthy points are the colours of the flower, apple-green edged or lined with white on the sepals, petals and epichile: the white lines on the ovary; the bright green median lines on the petals and epichile; the orange yellow, thick, fleshy mesochile; the blue gland to the pollinia: the winged column and the crenate edges to the petals and epichile. On drying the fleshy mesochile appears to become thin and membranous.

The type specimen described by Lindley was collected by Tweedie at Buenos Aires and is in the Kew Herbarium. The specimen is securely gummed to a sheet and the lip is so folded that it is easily realised how Lindley mistook the shape and depicted and described it inaccurately. This error led to Cogniaux mistaking the plant when he wrote a description for *Stenorrhynchus Bonariensis* Cogn. This latter was later figured by Warming. The plant (Hort. Kew. No. 330–23) for which the above description was drawn up was received from Major A. Pam from Buenos Aires in 1923 and flowered in November of the same year; a drawing and a photograph of it are preserved at Kew.

XXIII.—CONTRIBUTIONS TO THE FLORA OF SINALOA*: V.

L. A. M. RILEY.

ROSACEAE.

Couepia polyandra (*H.B.K.*) *Rose* in CNH. v. 196, 216 (1899); CNH. xxiii. 344.—*Hirtella polyandra* H.B.K. Nov. Gen. et Sp. vi. 246, t. 565 (1824). *Moquilea Kunthiana* Mart. et Zucc. (1832).

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* Continued from *K.B.* 1923, p. 401.

Common along the west coast of Mexico, where it is evidently native (Rose). Sinaloa (fide Standley).

Vernacular name " Guayabito de tinta ".

The fruit is yellow and edible.

[**Rubus arizonicus** (*Greene*) *Rydb.* in N. Am. Fl. xxii. 446.—*Batidaea arizonica* Greene, Leaflets, i. 243 (1906). *Rubus strigosus* Seem. Bot. Herald, 282, partim, non Michx. ; Standley in CNH. xxiii. 331, partim.

Rancho of Guadalupe on the road from Mazatlan to Durango, *Seemann* 2177.

The above locality is in the state of Durango, but the species doubtless occurs in Sinaloa.

Standley (l.c.) reduced *R. arizonicus* to *R. strigosus.* The former species seems to differ in the 7-foliolate leaflets, which are more acutely dentate. Seemann's specimen consists only of a portion of a sterile branch and the determination is not certain.]

R. Palmeri *Rydb.* in N. Am. Fl. xxii. 456 (1913) ; CNH. xxiii. 332.

Sinaloa (fide Standley).

Vernacular name " Mora ".

Cercocarpus macrophyllus *C. K. Schneider*, Handb. Laubh. i. 530 (1905) ; N. Am. Fl. xxii. 419 ; CNH. xxiii. 327.—*C. fothergilloides* Seem. Bot. Herald, 283, partim ; Hemsl. Biol. i. 373, partim, non H.B.K.

Santa Lucia, *Seemann* 1979.

Fragaria mexicana *Schlecht.* ; Hemsl. Biol. i. 375 ; Rydb. in Mem. Dep. Bot. Columb. Univ. ii. 173 ; N. Am. Fl. xxii. 358. —*F. vesca* Seem. Bot. Herald, 282, non L.

Common in the Sierra Madre, *Seemann* 2178.

Vernacular name " Fresa de la Sierra ".

There are six plants on the sheet of *Seemann* 2178 in the Kew Herbarium. The indumentum of the petioles on different specimens varies from reflexed to ascending or nearly appressed.

Alchemilla procumbens *Rose* in CNH. x. 96, t. 27 (1906).—*A. sibbaldiaefolia* Seem. Bot. Herald, 282, non H.B.K. *Lachemilla procumbens* Rydb. in N. Am. Fl. xxii. 382.

Sierra Madre, *Seemann* 2179.

SAXIFRAGACEAE.

Hydrangea Seemannii *Riley*, sp. nov. ; affinis *H. Oerstedii* Briq. (*Cornidiae radiatae* Oerst.) quacum ab auctoribus quibusdam confusa esse videtur, sed ramulis fertilibus brevibus, foliis coriaceis non membranaceis pro rata angustioribus subintegris subtus non glabris utrinque luteo-viridibus, petiolis multo longioribus facile cognoscitur.

Ramuli steriles longitudinaliter rugosi, fere 7 mm. diametro 1·5 dm. infra apicem, brunneo-cinerei, glabriusculi ; fertiles 7-12·5 cm. longi, inferne glabriusculi, superne pilis parvis

stellatis ferrugineis obtecti. *Folia* lanceolata vel elliptico-lanceolata, basi in petiolum angustata, apice acuta vel cuspidato-acuta rarius obtusa, 9·5–15 cm. longa, 3·5–6 cm. lata, luteo-viridia, coriacea, utrinsecus 8–11-nervia, supra glabra, subnitida, conspicue reticulata, subtus obscura, pilis stellatis e punctulis brunneis orientibus mox caducis praedita, hinc glabra et brunneo-punctata, costa valde conspicua lineis brevibus et punctis notata juxta basin laminae 2·5 mm. lata, nervis lateralibus prominentibus, minutissime et remote denticulata, marginibus revolutis; petioli 3·5–5·5 cm. longi, usque ad 3 mm. diametro. *Dichasia* in umbella unica disposita, omnino glabra ut videtur, pedunculis 0·2–2·5 cm. longis plerumque brevibus, axi primaria cum thyrso abbreviato terminali 1–3 cm. longa, axibus secundariis 2·5–5·5 cm. longis cymulas laxe et racemose dispositas gerentibus; pedicelli sub fructu 2–3 mm. longi, florum sterilium 3·5–4 cm. longi. *Sepala* florum sterilium late obovata, 1·5 cm. longa, 1·2 cm. lata, in basin cuneato-angustata, apice truncata vel retusa, membranacea, reticulata, glabra. *Capsula* poculiformis, lateraliter striata, 3 mm. diametro, 2·5 mm. alta; styli sub fructu circiter 2 mm. longi. *Semina* linearia, curvata, 0·5 mm. longa.—*H. peruviana* Seem. Bot. Herald, 293, quoad specimina sua, non Moric. *H. Oerstedii* Standley in CNH. xxiii. 308, quoad loc. Sierra Madre, non Briq.

Sierra Madre, common in barrancas, climbing and rooting on old trees like ivy, *Seemann* 2142 (type in Herb. Kew.); *Seemann* " 922 " (scripsit W. J. Hooker).

This species was included both by Seemann (l.c.) and Hemsley (Biol. i. 383), and also, apparently, by Small (N. Am. Fl. xxii. 161) in *Hydrangea peruviana* Moric. (*Cornidia peruviana* Small). Hemsley and Small further cite *Cornidia radiata* Oerst. as a synonym, Small, in addition, including *Sarcostyles peruviana* Presl. As Briquet points out (Ann. Conserv. & Jard. Bot. Genève, xx. 399), these three names belong to three different species " dont deux (*Hydrangea peruviana* et *Sarcostyles peruviana*) sont complètement étrangères à la flore de l'Amérique centrale ".

Phyllonoma coriacea *Riley*, sp. nov.; affinis *P. laticuspidi* (Turcz.) Engl., a qua foliis coriaceis grossius serratis in acumen gradatim angustatis nervis paucioribus, inflorescentiis versus mediam laminam nec basi acuminis dispositis differt.

Rami longitudinaliter rugosi, 2·5 mm. diametro 2·5 dm. infra apicem, glabri, brunnei vel brunneo-nigrescentes. *Folia* lanceolata, 3–6 cm. longa, 0·7–2 cm. lata, in petiolum cuneato-angustata, apice longe et gradatim acuminata, fere e basi crasse calloso-serrata, acumine integro apice calloso, fulva, utrinsecus 7–9-nervia, supra nitida, glabra, costa impressa nervis lateralibus haud impressis satis conspicuis, subtus obscura, minute lepidota, costa prominente nervis lateralibus et venulis conspicuis anastomosantibus; petioli 4–5 mm.

longi. supra canaliculati. *Inflorescentiae* 1·5–2 cm. infra apices foliorum orientes: pedunculus incrassatus. 4–5-florus, 1–1·5 mm. longus: pedicelli 2 mm. longi. *Calyx* 5-lobus. lobis cuspidato-triangulatis subacutis circiter 0·25 mm. longis. *Petala* ovato-triangulata. vix 1 mm. longa, 0·75 mm. lata, minutissime ciliata, apice subacuta. *Stamina* 0·5 mm. longa. *Ovarium* 8-ovulatum; styli 2, in disco carnoso fere 1 mm. diametro insidentes. *Bacca* prolato-sphaeroidea, 5 mm. alta, 4·5 mm. diametro. *Semina* 3 ut videtur, cylindrica, vix curvata, 1·75 mm. longa, 1 mm. diametro, nigra, verrucosa.—*Dulongia acuminata* Seem. Bot. Herald, 275, partim, non H.B.K. *Phyllonoma ruscifolia* Hemsl. Biol. i. 385, partim, non Willd. *P. laticuspis* Rusby in N. Am. Fl. xxii. 191, quoad loc. Sierra Madre, non Engl.

Sierra Madre, *Seemann* 2163 (type in Herb. Kew).

CRASSULACEAE.

Sedum alamosanum *S. Wats.* in PAA. xxv. 148 (1890); Lloyd Praeger in Journ. Hort. Soc. xlvi. 133, f. 69 (1921).

Providencia, *E. A. H. Tays.*

RHIZOPHORACEAE.

Rhizophora Mangle *L.*; SBH. 283; Hemsl. Biol. i. 402.

Common along the coast (Seemann).

COMBRETACEAE.

Terminalia Catappa *L.*; CNH. v. 221.

In the town of Rosario (Rose).

Vernacular name " Almendra ".

Rose remarks that these trees seem to be frequent in the towns of Western Mexico and furnish one of the few shade-trees there, growing to the height of 35–40 feet. It is a native of tropical Asia.

Conocarpus erectus *L.*; Jacq. Amer. 78, t. 52, fig. 1; Hemsl. Biol. i. 403.

Escuinapa; Arroyo de la Codorniz, 42 m., *Gonzalez* 1130.

Vernacular name " Botoncahui ".

Combretum farinosum *H.B.K.*; Pittier in CNH. xviii. 243.

Mazatlan, *Purpus* 366. San Ignacio; Pueblo de Coyotitan, 280 m., *Gonzalez* 118.

Vernacular name " Compío ".

MYRTACEAE.

Psidium Guajava *L.*; Popenoe. Man. Trop. Fruits. 272. t. 35.

San Ignacio: Arroyo de Tacuitapa, 300 m., *Gonzalez* 327.

Vernacular name " Guayabo ".

P. Sartorianum *(Berg) Niedenzu.*—*Mitranthes Sartoriana* Berg in Linnaea, xxix. 248 (1857–8).

San Ignacio ; Piedras de Lumbre, 50 m., *Gonzalez* 152.
Vernacular name " Arrayán ".

This was so determined at Washington according to Señor Gonzalez. I have not seen the type of this species. and Señor Gonzalez' specimen at Kew bears neither flowers nor fruit. What there is of it agrees with Berg's description.

Eugenia Schiedeana *Schlecht.* in Linnaea, xiii. 418 (1839).
Without precise locality, *Gonzalez* 1110.
Vernacular name " Arrayán ".

Señor Gonzalez' plant shows certain points of difference from typical *E. Schiedeana*, namely in the more divergent branching, and in the shorter pedicels and much smaller bracteoles.

Myrtacea.
San Ignacio ; Honda Caña, 460 m., *Gonzalez* 858.
Vernacular names " Guayabillo ", " Arrayancillo ".

The flowers on Señor Gonzalez' specimen are in the bud stage, and are too immature for even generic determination. Expanded flowers and mature fruit are desired.

MELASTOMACEAE.

Heeria subtriplinervia (*Link et Otto*) *Triana* in Trans. Linn. Soc. xxviii. 34 (1873).—*Melastoma subtriplinervium* Link et Otto, Ic. Pl. Rar. 47, t. 24 (1828). *Heterocentron mexicanum* Hook. et Arn. Bot. Beech. 290 ; SBH. 284 ; non Hook. Bot. Mag. t. 5166, nec Naud.

Sierra Madre, *Seemann* 2176. San Ignacio ; Cerro de la Silla, 1180 m., *Gonzalez* 734.

Monochaetum calcaratum (*DC.*) *Triana* l.c. 63.— *Arthrostemma calcaratum* DC. *Monochaetum myrtoideum* Seem. Bot. Herald. 284, non Naud.
Sierra Madre, *Seemann* 2173.

Miconia saxicola *Brandegee* in Zoe, v. 215 (1905).
Cliffs of the Cerro Colorado, *Brandegee.*

Miconia sp.
Sierra Madre, *Seemann* 2172.

Seemann's specimen is in fruit only. The material is insufficient for adequate description.

LYTHRACEAE.

Ammannia auriculata *Willd.* ; Zoe, v. 214.
Culiacan, *Brandegee.*

Rotala dentifera (*A. Gray*) *Koehne* ; Zoe, v. 214.— *Ammannia dentifera* A. Gray.
Culiacan, *Brandegee.*

Cuphea blepharophylla (*Blake*) *Riley*, comb. nov.—*Parsonsia blepharophylla* Blake in Proc. Biol. Soc. Wash.xxxii. 190 (1919).

San Ignacio: on the road from Yxtagua to Agua Fria, 340 m., *Salazar* 698.

C. calcarata *Benth.* var. **parastemon** *Koehne* in Engl. Pflanzenr. Lythrac. 155.—*C. calcarata* Seem. Bot. Herald, 284, non Benth.

Sierra Madre, *Seemann* 2170.

Koehne (l.c.) gives the locality of Seemann's specimen as "zwischen Zacatecas und Real del Monte". This locality applies to another specimen altogether, viz. *Coulter* 169. The mistake has evidently arisen through a misunderstanding of Seemann's method of citing localities in the "Botany of the Herald".

C. delicatula *Brandegee* in Zoe, v. 213 (1905).

Cofradia and Cerro Colorado, *Brandegee.*

C. Hookeriana *Walpers* forma **polysperma** *Koehne* in Engl. Bot. Jahrb. ii. 421 (1882); Engl. Pflanzenr. Lythrac. 176.—*C. Hookeriana* Seem. Bot. Herald, 284, partim.

Sierra Madre, *Seemann* 2171. San Ignacio; C. de la Vieja, 1380 m., *Gonzalez* 98.

Seemann's no. 2171 is the type of forma *polysperma.* Koehne describes forma *typica* as possessing 6 (very rarely 4) petals and relatively few (14–30) ovules. I have examined several sheets of material from the type locality (Tepic) and have been unable in any case to detect more than 2 petals, although the number of ovules is about 24. Hooker and Arnott (Bot. Beech. 289) in a note to their description of *C. floribunda* (*C. Hookeriana*) remark that they have not observed the small petals, though it is not certain whether this means that they were absent. I have seen three sheets of material determined by Koehne as forma *typica*; these specimens have 6 petals and were collected in Chiapas and Guatemala. The calyx, also, is noticeably longer than in the specimens from north-west Mexico.

C. humayana *Brandegee* in Zoe, v. 214 (1905).

Low damp ground near Culiacan, *Brandegee.*

C. Llavea *La Llave et Lexarza*, Nov. Veg. Descr. i. 20 (1824): SBH. 284.—*C. Llavea* var. *barbigera* Hook. et Arn.; Koehne in Engl. Bot. Jahrb. ii. 396 (1882); Engl. Pflanzenr. Lythrac. 156. *C. barbigera* Hook. et Arn. Bot. Beech. 289 (1840).

Cerro de Pinal, fl. Dec., *Seemann* 1523.

Vernacular name "Yerba de San Pedro".

The plant is used against fever (Seemann).

C. lobophora *Koehne* in Mart. Fl. Bras. xiii. pars 2, 235 (1877); Engl. Pflanzenr. Lythrac. 158; Zoe, v. 214.

Various forms collected at Culiacan, Cofradia and Cerro Colorado, *Brandegee.*

C. Palmeri *S. Wats.* in PAA. xxi. 428 (1886); Koehne in Engl. Pflanzenr. Lythrac. 157; Zoe, v. 214.

Culiacan, *Brandegee.*

I have not seen Brandegee's specimen. He describes the four ventral petals as white, whereas S. Watson describes the petals as purple.

C. Roseana *Koehne*; Engl. Pflanzenr. Lythrac. 168.—*C. trichopetala* Rose in CNH. v. 196, t. 22 (1899), non Rusby et Koehne.

Colomas, 600 m., *Rose* 1769.

Cuphea scelopetala *Riley*, sp. nov.; affinis *C. laminuligerae* Koehne, a qua foliis basi subcordatis, calyce hispidulo haud strigoso, petalis dorsualibus majoribus differt.

Caulis simplex, erectus, tenuis, 1 mm. diametro 3·5 dm. infra apicem, fulvus, crispule et minute pallido-pilosus, internodiis 3·5–7 cm. longis inferioribus brevioribus. *Folia* sessilia, e basi subcordata ad apicem obtusum gradatim attenuata, 1·5–2·5 cm. longa, basi 1–5 mm. lata, penninervia, utrinque scabro-hispidula, costa et nervis supra impressis subtus satis conspicuis, marginibus subrevolutis breviter scabro-ciliatis. *Flores* in axillis bini tergeminive; pedicelli 2–4 mm. longi; bracteolae lanceolatae, vix 0·5 mm. longae. *Calyx* 1·1 cm. longus, postice gibbosus, medio constrictus, in os dilatatus, regione angustissima 1·5 mm. lata, purpurascens, setuloso-hispidus, intus ore lanato, lobo dorsuali triangulato 2·5 mm. alto duabus squamis munito, ventralibus 0·5 mm. altis. *Petala dorsualia* late obovata, 6 mm. longa, 4·5 mm. lata, in unguem 2·5 mm. longum angustata, violacea, crenulata; ventralia oblanceolata, 5 mm. longa, 2 mm. lata, brevissime unguiculata, integra, pallida. *Stamina* 11, omnia fertilia; filamenta glabra, longiora 3 mm., breviora 2 mm. longa. *Ovarium* disco dorsuali carnoso pendente, 3·5 mm. longum 1·5 mm. latum, 6-ovulatum, leviter pilosum; stylus 6 mm. longus, glaber.

Sinaloa: San Ignacio; R. de Los Otates, 320 m., *Gonzalez* 440 (type in Herb. Kew.).

Lawsonia inermis *L.*; Koehne in Engl. Pflanzenr. Lythrac. 270.—*L. alba* Lam., nomen abortivum; Watt, Dict. Econ. Prod. India, iv. 597–602; Kew Bull. Add. Ser. ix. 322.

Cosalá; Conitaca, 150 m., *Gonzalez* 825.

Vernacular name "Reseda".

This plant—the "Henna" of Africa and the East—is probably a native of north and north-east Africa, and western and southern Asia, whence it has been introduced into cultivation in all the warmer parts of the world.

ONAGRACEAE.

Jussieua octofila *DC.* in DC. Prodr. iii. 57 (1828).—*J. octovalvis* Swartz, partim, non *Oenothera octovalvis* Jacq. *J. octonervia*

Micheli in Mart. Fl. Bras. xiii. pars 2, 170, partim, non Lam. *J. suffruticosa* Urb. Symb. Antill. iv. 468, partim, non L.

Mazatlan, *Coulter* 181. San Ignacio ; Agua Caliente, 170 m., *Gonzalez* 346.

Lamarck (Encycl. iii. 332 ; 1789) based *J. octonervia* on *Oenothera octovalvis* Jacq., which is a glabrous plant. He explained the change of the specific name on the ground of inappropriateness. Swartz (Obs. Bot. 142 ; 1791) restored Jacquin's specific name, and cited his plant, but in his description referred to it as pubescent. De Candolle (l.c.) separated the pubescent form as *J. octofila*, citing Plum. ed. Burm. t. 175, fig. 1. Unfortunately the description accompanying Plumier's figure refers to the plant as glabrous. Urban cited both species as synonyms of *J. suffruticosa* L. As Ridley (Journ. Bot. 1921, 257) points out, *J. suffruticosa* L. is founded on Rheede's figure and description (Hort. Malab. ii. 95, t. 49) which has very short fruit and petals shorter than the calyx-lobes, and seems to be a very distinct plant. In *J. octofila* the petals are longer than the calyx-lobes, the fruit is about 4·5 cm. long, and two slender bracteoles may usually be found either at the apex of the pedicel or along the calyx-tube. Until the genus can be competently revised it seems desirable to keep these species distinct.

I refer to this species also :—Guaymas, *Palmer* 257 ; Acapulco, *Palmer* 213 ; Mexico, *Beechey*.

[**J. repens** *L.* should occur in Sinaloa, but I have found no records.]

Semeiandra grandiflora *Hook. et Arn.* Bot. Beech. 291, t. 59 ; SBH. 283.

Sierra Madre, *Seemann* 2168. San Ignacio ; C. de la Silla, 1200 m., *Gonzalez* 294.

Lopezia conjugens *Brandegee* in Univ. Calif. Publ. Bot. vi. 59 (1914).

Near Cofradia, *Brandegee*.

Brandegee remarks that this species is "intermediate between *Lopezia* proper and *L. clavata* which has been included by Dr. Rose in his genus *Pelozia*".

Lopezia pauciflora *Sprague et Riley* in Journ. Bot. 1924, 15, diagnosis tantum ; quoad flores *L. oaxacanam* Rose et *L. strictam* Rose revocans, ab illa indumento caulis et foliorum, unguibus petalorum anteriorum longis linearibus, ab hac sepalis extra setulosis differt.

Caulis teres, gracilis, flexuosus, patule ramosus, 1·5 mm. diametro 4 dm. infra apicem, superne crispule pilosus, inferne breviter retrorsum appresse setulosus ; internodia 1·5–3 cm. longa. *Folia* lanceolata vel rarius ovato-lanceolata, 2–5 cm. longa, 0·5–2·5 cm. lata, apice breviter acute acuminata, basi cuneata, sparse inconspicue denticulata, inferiora praecipue

subtus densiuscule pubescentia, superiora sparsius induta : petioli graciles, dense crispule pubescentes, ei foliorum inferiorum 0·8–1·9 cm. longi, ei foliorum superiorum 2–5 mm. longi : folia ramorum minora, angustiora. *Racemi* axin primariam et ramos terminantes, laxi, pauciflori, bracteis etiam supremis plus minusve foliaceis. *Pedicelli* filiformes, sub lente conspicue pilosi, circiter 1·4–1·8 cm. longi, sub fructu vix elongati. *Sepala* linearia, obtusa, 5·5–6·5 mm. longa, extra setulosa, posterius et anterius basi circiter 1 mm. lata, lateralia angustiora. *Petala anteriora* 7·5–7·75 mm. longa, ungue 2·75 mm. longo lineari, lamina oblongo-obovata in unguem angustata circiter 5 mm. longa 2·5 mm. lata ; petala posteriora circiter 7 mm. longa, bituberculata et biappendiculata, ungue infra tubercula 1·75 mm. longo, appendiculis patentibus vel leviter ascendentibus, parte supra appendiculas in toto 5 mm. longa anguste spathulata conspicue unguiculata, lamina parva 0·75 mm. lata. *Filamentum* 4 mm. longum, parte inferiore lineari carnosa 2·8 mm. longa, parte superiore filiformi-subulata 1·2 mm. longa ; anthera oblongo-linearis, 1·8 mm. longa, basi sagittata. *Staminodium* 5·5 mm. longum, ungue circiter 2 mm. longo oblongo-lineari sursum sensim angustato medio 0·5 mm. lato, lamina elliptico-obovata vix ultra 3 mm. longa et 2 mm. lata apice retusa, sinu 0·2 mm. alto apiculato. *Ovarium* glabrum, stylo tandem 4 mm. longo. *Capsula* suborbicularis, circiter 2·5 mm. diametro. —*L. racemosa* Seem. Bot. Herald, 283 (1856), non Cav.

Sierra Madre, *Seemann* 2169 partim (type in Herb. Kew.).

Seemann's no. 2169, which he identified as *Lopezia racemosa*, comprised two species, *L. pauciflora* and *Pelozia laciniata* Rose.

[**Lopezia tepicana** *Sprague et Riley* in Journ. Bot. 1924, 15, diagnosis tantum ; quoad flores *L. oaxacanam* Rose et *L. strictam* Rose revocans, ab illa sepalis glabris, petalis posterioribus latius spathulatis, unguibus petalorum anteriorum filiformibus, ab hac forma petalorum posteriorum, ab ambabus caule retrorsum appresse setuloso, foliis utrinque dense setulosis differt.

Caulis strictus, ramosus, teres, gracilis, 2 mm. diametro 5 dm. infra apicem, setulis brunneis retrorsum appressis indutus : internodia 5–6·5 cm. longa. *Folia* lanceolata vel ovato-lanceolata, 3–3·5 cm. longa, 1·3–1·7 cm. lata, apice breviter acute acuminata, basi cuneata, minute sparsiuscule denticulata, itaque primo visu leviter undulata, utrinque dense setulosa, supra setulis e basi tuberculari subulatis inflatis ad 1·75 mm. longis statu vivo ut videtur non appressis, subtus costa nervisque lateralibus patenter appresse setulosis ceterum setulis sparsioribus pilisque nonnullis minoribus induta ; petiolus 0·7–1 cm. longus, retrorsum setulosus ; folia ramorum lanceolata, 0·9–1·8 cm. longa, 2–7 mm. lata, subsessilia vel petiolo usque ad 2 mm. longo, basi cuneata vel saepe rotundata, apice acuta. *Racemi* axin primariam et ramos et eorum ramulos terminantes. ei axis primariae 15–25 cm. longi, ramorum 8–15 cm. longi, ramulorum 4–6 cm. longi. *Bracteae* subulatae vel inferiores lineari-lanceolatae, plerumque 1–3 mm. longae, inferiores usque ad 6·5 mm. longae. *Pedicelli* axillares, solitarii, filiformes, primo visu glabri, revera minutissime sparse glanduloso-puberuli, circiter 1 cm. longi, sub fructu patentes vel sursum curvati, 1·5–2 cm. longi. *Alabastra* primum clavata, acuta, demum dimidio inferiore incrassato suboblonga, acuta, medio constricta, circiter 5 mm. longa. *Sepala* 4·5-5 mm. longa, glabra ; posterius et anterius sublinearia, superne per 1 mm. in apicem obtusum angustata, basi 0·9–1 mm., superne 0·7 mm. lata ; lateralia subspathulato-linearia, inferne et superne 0·7 mm., medio 0·4 mm. lata. *Petala anteriora* 5·5 mm. longa, ungue lineari, lamina obovata 2·75 mm. longa 2 mm. lata ; petala posteriora 6 mm. longa, bituberculata et biappendiculata more *L. oaxacanae*, ungue infra tubercula 1·5 mm. longo, tuberculis 0·4 mm. longis, appendiculis 0·7 mm. longis patentibus sursum concavis vel leviter descendentibus, parte supra appendiculas in toto 4 mm. longa spathulata conspicue unguiculata, ungue 1·4 mm. longo, lamina 1 mm. lata. *Stamen* 4·5 mm. longum ; filamenti pars inferior carnosa, linearis, 2·5 mm. longa, basi 0·6 mm. lata, superne 0·4 mm. lata, pars superior filiformi-subulata, 1 mm. longa ; anthera oblongo-linearis, basi sagittata, 1·75 mm. longa, 0·3 mm. lata, sinu basali 0·6 mm. alto. *Staminodium* 4 mm. longum, ungue infra medium geniculato, parte infra geniculum 1 mm. longa 0·7 mm. lata, parte supra geniculum 1·3 mm. longa medio 0·25 mm. lata, lamina elliptica anguste retusa 2·25 mm. longa 1·8 mm. lata, sinu 0·2 mm. alto tuberculato-apiculato. *Ovarium* circiter 1 mm. diametro, glabrum ; stylus 2·5 mm. longus. *Capsula* suborbicularis, circiter 2·3 mm. diametro, glabra.— *L. hirsuta* Hook. et Arn. Bot. Beech. 291 (1840) ; Benth. Bot. Sulph. 93 (1844) ; SBH. 283 (1856) ; non Jacq.

Tepic : near the town of Tepic, *Sinclair* (type in Herb. Kew.), *Barclay*, *Beechey.*

Two different species may be represented on Barclay's sheet, the larger specimen being *L. tepicana*. The smaller specimen differs in the spreading indumentum of the stem, and the more compact infructescence. Beechey's sheet consists of three specimens, the central one being *L. tepicana*. The specimen at the top left-hand corner of the sheet differs in the longer pedicels (over 1·5 cm. in flower), in the buds remaining clavate until the expansion of the flower, and in the staminode, which has a larger, more deeply retuse lamina and a shorter claw. The material of the third specimen is inadequate.]

Pelozia laciniata *Rose* in CNH. xii. 296 (1909).—*Lopezia racemosa* Seem. Bot. Herald, 283, partim, non Cav.

Sierra Madre, frequent, *Seemann* 2052, 2169 partim.

I have not been able to compare Seemann's plants with any specimens of *P. laciniata*. My determination is based on Rose's description and figure. With these Seemann's specimens agree, except that the stems are shorter (10–30 cm.) and the leaves deeply, rather than shallowly, toothed.

Seemann (Bot. Herald, 283) gives " Fuchsia sp. (Leaves only). Sierra Madre, near Santa Lucia ". I have not found any of his material, and it is probable that he did not preserve any specimens. Nor have I found any record of the genus from localities further north than Michoacan and Hidalgo. It is possible that Seemann's generic determination was incorrect.

SAMYDACEAE (FLACOURTIACEAE).

As pointed out by Sprague in Journ. Bot. 1922, 72, the correct name of the family under International Rules is *Samydaceae*, not *Flacourtiaceae.*

Prockia crucis *L.* ; CNH. xxiii. 840.
Sinaloa (fide Standley).

Xylosma velutinum (*Tul.*) *Triana et Planch.* Prodr. 97 (1862). —*Flacourtia velutina* Tul. *Myroxylon velutinum* Warb. ; Standley in CNH. xxiii. 841.
Sinaloa (fide Standley).

In the Index Kewensis this species is wrongly attributed to " Triana and Karsten in Karsten, Fl. Columb. i. 123, t. 97 (1858)," which error is followed by Standley (l.c.).

Casearia arguta *H.B.K.* Nov. Gen. et Sp. v. 364.
Escuinapa ; Cerro del Muerto, 39 m., *Gonzalez* 1128.
Vernacular name " Cuacoyolillo ".

I have compared Señor Gonzalez' plant with the original description, from which it differs in the smaller leaves which are somewhat pilose on the upper surface. The original specimen, however, was evidently more mature, as it did not bear flowers but only fruits. For this reason the determination cannot be regarded as certain, as Señor Gonzalez' plant bears flowers and leaves only. From Central American material hitherto referred to *C. arguta* it differs in the smaller leaves and larger flowers. The type locality near La Venta del Exido is about 20 miles inland from Acapulco on the road to Chilpancingo.

C. dolichophylla *Standley* in CNH. xxiii. 846 (1923).
Sinaloa (fide Standley).
Vernacular name " Chilillo ".

Standley refers here " a large number of specimens all of which may not be conspecific." Before seeing his description of *C. dolichophylla* I had drawn up a description of *Gonzalez* 326 from Sinaloa as a new species of *Casearia*. Standley cited *Purpus* 7447 from Oaxaca as the type of *C. dolichophylla*. As I have not seen this, and also as the Sinaloa specimen bears considerably laxer inflorescences than specimens from Guerrero and Nicaragua which seem referable to *C. dolichophylla*. I append my original unpublished description of the Sinaloa plant, which may prove to be different.

Ramus annotinus unicus exstans vix flexuosus, albido-cinerascens, longitudinaliter rugosus, glaber, 3 mm. diametro 2 dm. infra apicem, foliis jam delapsis. *Ramuli hornotini* exstantes abbreviati, e perulis quatuor cuspidato-triangulatis 2 mm. longis orientes, 3–5 cm. longi, brunnei, molliter et breviter pilosi, basi praecipue lenticellis pallidis valde suberosis oblongo-linearibus usque ad 2·5 mm. longis muniti, corymbos axillares 2–4 gerentes, in innovationes desinentes. *Folia* ramulorum elliptico-oblonga, 2–3 cm. longa, 1–1·6 cm. lata, apice rotundata, basi subcordata crenulato-dentata, utrinque pallide pilosa. *Inflorescentiae* pedunculo 0·5–1 cm. longo incluso 2·5–3 cm. longae, gracillime flexuosae ; pedicelli 4–5 mm. longi ; bracteae lanceolatae, usque ad 1 mm. longae. *Sepala* elliptica, apice rotundata, 3·25 mm. longa, 1·75 mm. lata, molliter pilosa. *Stamina* octo, 2·5 mm. longa ; antherae 0·75 mm. longae ; filamenta 1·75 mm. longa, pilosiuscula. *Staminodia* villosa. *Ovarium* ampullaceum, cum stylo 3 mm. longum, vix 1 mm. diametro, pilosum ; ovula circiter 20.

Sinaloa : San Ignacio ; Tacuitapa, 300 m., *Gonzalez* 326 (Herb. Kew).

Vernacular names " Chilillo ", " Garrapatilla ".

C. laevis *Standley* in CNH. xxiii. 845 (1923).
Mazatlan, *Rose, Standley and Russell* 14154.

C. obovata *Schlecht.* ; CNH. xxiii. 845.
Sinaloa (fide Standley).

C. Pringlei *Briquet* in Ann. Conserv. & Jard. Bot. Genève, ii. 65 (1898) ; CNH. xxiii. 846.
Sinaloa (fide Standley).

LOASACEAE.

Mentzelia adhaerens *Benth.* Bot. Sulph. 15 ; Zoe, v. 213.
Cerro Colorado, *Brandegee.*

TURNERACEAE.

Turnera humifusa (*Presl*) *Endl.* ; CNH. v. 166, 230.—*Bohadschia humifusa* Presl Reliq. Haenk. ii. 98, t. 68 (1836). *T. diffusa* Urb. in Jahrb. Bot. Gart. Berlin, ii. 125, partim ; Standley in CNH. xxiii. 848, partim. *T. aphrodisiaca* L. F. Ward in Virginia Medical Monthly, April 1876, p. 49, teste Rose.

Between Rosario and Colomas, *Rose* 1612. La Noria, above Mazatlan, *Rose.*

Vernacular name " Damiana ".

Used as a tea and taken to relieve pain in the stomach and bowels (Rose).

T. Pumilea *L.;* Urb. in Jahrb. Bot. Gart. Berlin, ii. 314 (1883).
San Ignacio; C. del Potrerillo, *Gonzalez* 609.
Vernacular name " Bruja ".

T. ulmifolia *L.* var. **caerulea** (*DC.*) *Urb.* l.c. 144; CNH. v. 166.—*T. caerulea* DC. *T. ulmifolia* Standley in CNH. xxiii. 847.
Cerro de Pinal, *Seemann* 1515. San Ignacio; Yxtagua, 600 m., *Gonzalez* 470. Colomas, *Rose* 1692.

CARICACEAE.

Carica Papaya *L.*; Popenoe, Man. Trop. Fruits, 224 et seq.
Without locality, *Gonzalez* 239.
Vernacular names " Copal ", " Cucaracho ".

C. sp.
Brandegee (Zoe, v. 213) mentions a plant which he found to be not uncommon about Cofradia. The local name is " Quadratos " and he states that it is " evidently near *C. caudata* of the Cape Region of Baja, California ".

PASSIFLORACEAE.

Passiflora foetida *L.*; Mart. Fl. Bras. xiii. pars 1, 582.
Choix; Tasajera, 420 m., *Gonzalez* 878.
Vernacular name " Clavellín blanco ".

P. mexicana *A. Juss.* in Ann. Mus. Hist. Nat. Paris, vi. 108. t. 38, f. 2; SBH. 345.—*P. jorullensis* Hemsl. Biol. i. 478, partim, non H.B.K.
Islands in the harbour of Mazatlan, fl. Dec., *Seemann* 1516.

CUCURBITACEAE.

Luffa operculata var. **intermedia** *Cogn.* in CNH. i. 330 (1895); CNH. v. 122.
Agiabampo, *Palmer* 770. Ymala, *Palmer* 1686.

Schizocarpum Palmeri *Cogn. et Rose* in CNH. i. 100 (1891); CNH. v. 124; Zoe, v. 221.
Ymala, *Palmer* 1693; " the most common cucurbit " (Brandegee).

Momordica Balsamina *L.*; Fedde, Repert. xiv. 113.
On the lower Rio del Fuerte near Zaragoza, *Endlich* 713.
Vernacular name " Balsamina ".

M. Charantia var. **abbreviata** *Ser.* in DC. Prodr. iii, 311; Cogn. in DC. Monogr. iii. 437.— *M. zeylanica* Mill.; CNH. v. 122; CNH. viii. 193.
Culiacan, *Palmer* 1522. San Ignacio; Pueblo de Ajoya, 265 m., *Gonzalez* 60.
Vernacular name " Pepino ".

Roseanthus elongatus *Rose* in CNH. viii. 337 (1905); Zoe v. 222.
Cerro Colorado, *Brandegee.*

Cucurbita radicans *Naud.*: Cogn. in DC. Monogr. iii. 548; CNH. v. 121; Zoe, v. 222.

Culiacan. *Palmer* 1802. Altata to Cofradia, *Brandegee.*

Vernacular name "Chicoyote".

Melothria Donnell-Smithii *Cogn.* in Bot. Gaz. xvi. 9 (1891); CNH. v. 122.

Lodiego, *Palmer* 1604.

Maximowiczia sonorae *S. Wats.* in PAA. xxiv. 51 (1889); Zoe, v. 221.

Altata, *Brandegee.*

Brandegee remarks that the leaves and fruit are smaller than those of specimens from Guaymas—the type locality.

Apodanthera Roseana *Cogn.* in CNH. iii. 318 (1895); Zoe, v. 221.

Ymala, *Palmer* 1444. Altata to Culiacan, *Brandegee.*

Cayaponia dubia (*Hook. et Arn.*) *Rose* in CNH. v. 236.—*Anguria ? dubia ?* Hook. et Arn. Bot. Beech. 292. *Cayaponia attenuata* (Hook. et Arn.) Cogn. in DC. Monogr. iii. 769. *Bryonia attenuata* Hook. et Arn. Bot. Beech. 424.

Common on the west coast of Mexico, *Rose* 1481.

Said to be used in the place of soap (Rose).

Echinopepon cirrhopedunculatus *Rose* in CNH. i. 100, t. 4 (1891); CNH. v. 115; Zoe, v. 222.

Cerro Colorado, *Brandegee.*

E. lanatus (*Cogn.*) *Rose* in CNH. v. 117; Zoe, v. 222.—*Echinocystis lanata* Cogn.

Common over the whole region, *Brandegee.*

I have followed Rose (l.c.) and Dunn (*Kew Bull.* 1913, 148), in maintaining *Echinopepon* as a genus distinct from *Echinocystis.*

Elaterium longisepalum *Cogn.* in CNH. iii. 318 (1895); Zoe, v. 222.

Lodiego, *Palmer* 1600. Common in ravines, *Brandegee.* San Ignacio; Arroyo de Coacoyol, 420 m., *Gonzalez* 587.

I have not seen an authenticated specimen of *E. longisepalum*, and have determined Señor Gonzalez' plant from the description, with which it agrees except as regards the leaves, which, in a young state, are minutely setulose on the upper surface, and, in a mature state, are minutely and densely tuberculate on the lower surface.

Cyclanthera micrantha *Cogn.* in CNH. iii. 318 (1895); Zoe, v. 222.

Ymala, *Palmer* 1706; common in Sinaloa, *Brandegee.*

Sicyos acerifolius *Brandegee* in Univ. Calif. Publ. Bot. vi. 370 (1917).

Cofradia, *Brandegee.*

S. sinaloae *Brandegee*, l.c.

Culiacan and Cofradia, *Brandegee.*

CACTACEAE.

In the circumscription and sequence of genera I have adopted the plan of Britton and Rose's "Cactaceae".

Pereskiopsis Porteri (*Brandegee*) *Britton et Rose* in Smiths. Misc. Coll. l. 332 (1907); Cact. i. 28, f. 26.—*Opuntia Porteri* Brandegee ex Weber in Bois, Dict. Hort. 899.

Sinaloa, without precise locality (Weber, Britton and Rose).

Opuntia decumbens *Salm-Dyck*, Hort. Dyck. 361 (1834); Britton and Rose, Cact. i. 116, t. 20, ff. 1, 2.

Mazatlan (Britton and Rose).

O. fulgida *Engelm.* in PAA. iii. 306 (1856); Britton and Rose, l.c. 67, t. 12, f. 1.

Sinaloa (Britton and Rose).

O. Thurberi *Engelm.* l.c. 308; Britton and Rose, l.c. 53, f. 63.

Sinaloa (Britton and Rose).

[**O. tunicata** (*Lehmann*) *Link et Otto* in Pfeiff. Enum. Cact. 170 (1837); Coulter in CNH. iii. 444; Britton and Rose, l.c. 65. f. 80, t. 10, f. 1.—*Cactus tunicatus* Lehmann, Ind. Sem. Hort. Hamb. 5, 16 (1827).

Throughout Mexico (Coulter). Highlands of Central Mexico (Britton and Rose).

This species is reported from Sonora and Raza Island, and is distributed through the West Indies and South America, according to Coulter, but I have no actual record from Sinaloa.]

O. Wilcoxii *Britton et Rose* l.c. 172, f. 211 (1919).

Common on the hills in the coastal plain from southern Sonora to southern Sinaloa (Britton and Rose). Fuerte, *Rose, Standley and Russell* 13546.

Cephalocereus Purpusii *Britton et Rose*, Cact. ii. 56 (1920).

Mazatlan and Guadalupe, *Rose, Standley and Russell* 13749, 14741.

Pachycereus pecten-aboriginum (*Engelm.*) *Britton et Rose* in CNH. xii. 422 (1909); Cact. ii. 70, ff. 105, 106.—*Cereus pecten-aboriginum* Engelm. in PAA. xxi. 429 (1886); CNH. v. 253, 254.

On the west coast the Indians use the fruits as hairbrushes, which brushes Dr. Palmer observed in the houses of many Indians and poor Mexicans in Sonora and Sinaloa. The branches are cut off and set together to form hedges (Rose).

Wilcoxia papillosa *Britton et Rose*, Cact. ii. 112 (1920).

Culiacan, *Purpus*. San Ignacio; Tinamaxtita, 1340 m., *Mexican Commission* 848.

Vernacular name "Cardoncillo".

W. striata (*Brandegee*) *Britton et Rose* in CNH. xii. 434 (1909); Cact. ii. 111.—*Cereus striatus* Brandegee in Zoe, ii. 19 (1891); CNH. i. 331.

Agiabampo, *Palmer* 794.

Acanthocereus occidentalis *Britton et Rose*, Cact. ii. 125, f. 185 (1920).

San Blas, Mazatlan and Guadalupe, *Rose, Standley and Russell* 13431, 14050, 14752. Rosario, *Rose* 3170.

Confined to low thickets along the coast of Sinaloa (Britton and Rose).

Rathbunia alamosensis (*Coulter*) *Britton et Rose* in CNH. xii. 415 (1909); Cact. ii. 170, t. 25, ff. 1, 2.—*Cereus alamosensis* Coulter in CNH. iii. 406 (1896); Zoe, v. 190.

Topolobampo, *Porter.*

Vernacular name "Cina".

Specimens from Sinaloa and Tepic formerly assigned by Britton and Rose (l.c.) to *R. Kerberi* (K. Schum.) are now referred by them to *R. alamosensis.*

Selenicereus vagans (*K. Brandegee*) *Britton et Rose*, Cact. ii. 205, ff. 284, 285.—*Cereus vagans* K. Brandegee in Zoe, v. 191 (1904).

El Creston, Mazatlan, *Brandegee.*

Echinocereus scopulorum *Britton et Rose*, Cact. iii. 30, f. 34 (1922).

Topolobampo, *Rose, Standley and Russell* 13349.

Echinofossulocactus phyllacanthus (*Mart.*) *Lawrence* in Loud. Gard. Mag. xvii. 317 (1841); Britton and Rose, l.c. 118, f.124. —*Echinocactus phyllacanthus* Mart.

Reported from Mazatlan (Britton and Rose).

Ferocactus Wislizeni (*Engelmann*) *Britton et Rose*, l.c. 127, tt. 1, 12, f. 2.—*Echinocactus Wislizeni* Engelmann in Wisliz. Mem. Tour North Mexico, 96 (1848); CNH. i. 331.

Agiabampo, *Palmer* 803.

Mamillopsis Diguetii (*Weber*) *Britton et Rose*, Cact. iv. 20.—*Mammillaria senilis* var. *Diguetii* Weber in Bull. Mus. Hist. Nat. Paris, x. 383 (1904).

Sierra de Chabarra, Concordia, *Gonzalez.*

M. senilis (*Lodd.*) *Weber* in Bois, Dict. Hortic. 805 (1898) in obs.; Britton and Rose, l.c. 19, ff. 19, 20, 21.—*Mammillaria senilis* Lodd. ex Salm-Dyck, Cact. Hort. Dyck, 8, 82 (1850); Scheer in SBH. 286; K. Schum. Gesamtbeschreib. Kakt. 511 (1898).

Sierra Madre (Seemann).

Neomammillaria mazatlanensis (*K. Schum.*) *Britton et Rose* Cact. iv. 138.—*Mammillaria mazatlanensis* K. Schum. in Monatsschr. Kakt. xi. 154 (1901); Gürke, ibid. xv. 154, cum tab.

Mazatlan, on hills near the sea, *Rose.*

N. Ortegae *Britton et Rose*, l.c. 83, fig. 75 (1923).

Sinaloa, *Gonzalez.*

FICOIDACEAE.

[**Mollugo verticillata** *L.*

This undoubtedly occurs in Sinaloa, but hitherto I have found no record.]

UMBELLIFERAE.

Eryngium Beecheyanum *Hook. et Arn.* Bot. Beech. 294 (1840); Proc. Wash. Acad. Sc. i. 124.

Sierra de Choix, *Goldman* 270.

E. crassisquamosum *Hemsl.* in Hook. Ic. Pl. t. 2765 (1903).—*E. pectinatum* Seem. Bot. Herald, 294, partim; Hemsl. Biol. i. 561, partim; non Presl.

Sierra Madre, *Seemann* 2136.

E. cryptanthum *Hemsl.* in Hook. Ic. Pl. t. 2509 (1897).—*E. Beecheyanum* Seem. Bot. Herald, 294, partim; Hemsl. Biol. i. 560, partim; non Hook. et Arn.

Sierra Madre, *Seemann* 2135.

Museniopsis biennis var. **pinnatisecta** *Riley*, var. nov.; foliis caulinis majoribus pinnatisectis argutius dentatis a typo recedit. — *Velaea toluccensis*? Seem. Bot. Herald, 294, non DC. *Arracacia* sp. Hemsl. Biol. i. 564.

Sierra Madre, *Seemann* 2134.

M. peucedanoides (*H.B.K.*) *Coulter et Rose* in CNH. iii. 303 (1895); Proc. Wash. Acad. Sc. i. 132.—*Cnidium peucedanoides* H.B.K. *Eulophus peucedanoides* Benth. et Hook. f. *Velaea peucedanoides* Drude.

Near Colomas, *Rose* 1743.

[**Apium leptophyllum** *F. Muell. ex Benth.;* Sprague in Journ. Bot. 1923, 129–133.— *A. Ammi* Urb.; Coult. et Rose in Proc. Wash. Acad. Sc. i. 144 (1900).

Widely distributed in America from the Southern United States to Chile and the Argentine. As it is recorded from La Paz, Lower California, and from near the city of Durango, it may be expected to occur in Sinaloa.]

Coulterophytum macrophyllum *Coulter et Rose* in Proc. Wash. Acad. Sc. i. 156 (1900).

Near Colomas, *Rose* 1814.

Prionosciadium spp.; Coulter and Rose, l.c. 152.

Two species collected at Colomas, *Rose* 1649, 1815, are tentatively referred by Coulter and Rose (l.c.) to this genus.

Deanea glauca *Coulter et Rose*, l.c. 156 (1900).

Near Colomas, *Rose* 1781.

XXIV.—NEW OR NOTEWORTHY SOUTH AFRICAN PLANTS*.—VI.

J. Burtt Davy.

91. **Thalictrum minus** *L.* var. **caffrum** (*E. and Z.*) *Burtt Davy*, var. nov.; *T. caffrum* Eckl. & Zeyh., Enum.: 1 (1835). *T. minus* Harv. in Harv. & Sond. Fl. Cap. 1: 3 (excl. syn. Engl. Bot. t. 11) non L.

South Africa. Transvaal: Banks of the Vaal River near Potchefstroom, *Nelson* 71! and near Vereeniging, flg. Nov., *Pott* 3753! Cape Province: Katriviersberg, at Silo on the Klipplaatrivier, *E. and Z.* 3! (type). Also in Orange Free State and Basutoland.

Differs from glaucous forms of *T. minus* in the shorter (2–2·5 mm.) anthers with longer (about 0·5 mm.) usually recurved apiculus, and in the prominently nerved and thicker sepals. *T. minus* var. *scabrivena* Oliv. of Abyssinia differs from our plant in the much longer (3 mm. and more) anthers, and the scabrid veins on the under surface of the leaflets.

It is instructive to note that no form of *T. minus* appears to have been found in the extensive botanical collections made in that long stretch of temperate mountainous country intervening between the Transvaal and Abyssinia.

92. **Hexalobus monopetalus** (*A. Rich.*) *Engl. & Diels*, Monogr. 56 (1901). *Uvaria monopetala* A. Rich. *Hexalobus senegalensis* A. DC.

South Africa. Transvaal: Zoutpansberg Distr.; Waterpoort, *Rogers* 21545! This appears to be the most southern locality for this Tropical African species.

93. **Nymphaea calliantha** *Conard* var. **Nelsonii** *Burtt Davy*, var. nov.: a *N. calliantha* Conard sepalis petalisque brevioribus 4 cm. longis obtusis differt.

South Africa. Transvaal: Potchefstroom Distr.; Mooi River at Wonderfontein, *Nelson* 71! (type).

Herb aquatic. *Leaves* floating; blades green above, often purple or purplish beneath, 13–28 cm. long, 12–17 cm. broad, the basal lobes approximate or overlapping, acute, acuminate or shortly caudate; ribs on the under surface only moderately raised: leaf-margins entire (or not dentate, though sometimes obsoletely sinuate or repand). *Flowers* 10–15 cm. diameter, white, pale bluish, blue or pink. *Sepals* ovate-lanceolate (narrowed towards the base), 6–7 cm. long, obtuse, with black linear dashes near the margin (or these sometimes wanting). *Petals* 15 to 25, lanceolate, obtuse, up to 4 cm. long and 1·5 cm. broad. *Filaments* 0·4 cm. broad at base. *Anther-appendages* 0·6 cm. long, 1 mm. broad at base, subacute, yellow.

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* Continued from *Kew Bulletin*, 1922, p. 335.

94. **Cleome maculata** (*Sond.*) *Burtt Davy*, comb. nov. *Polanisia maculata* Sond. in Linnaea 23: 6 (1850). *Tetratelia maculata* Sond. in Harv. & Sond. Fl. Cap. 1: 58 (1860). *Chilocalyx maculatus* Gilg & Benedict in Engl. Jahrb. 53: 16 (1915).

95. **Cleome Conrathii** *Burtt Davy*, comb. nov. *Polanisia triphylla* Conrath in Kew Bull. 1908: 220; non *Cleome triphylla* L.

96. **Cleome rubella** *Burch.*, Travels 1: 543 (1822). *C. rupestris* Sond. in Linnaea 23: 6 (1850).

An examination of Burke's specimen of *C. rupestris* from the Vaal River (the twin specimen of Zeyher's type), and of numerous examples of *C. rubella* from the Transvaal, Griqualand West and Bechuanaland, including Burchell's type, shows them to be conspecific.

97. **Cleome Breyeri** *Burtt Davy*, sp. nov.; *C. pachycephalae* Gilg et Bened. affinis, sed frutex ramosus, petiolis foliolisque brevioribus obovoideis vel rhomboideis, staminibus magis numerosis, differt.

South Africa. Transvaal: Zoutpansberg Distr.; Wylies Poort, near Louis Trichardt, *Dr. Breyer in herb. Transv. Mus.* 19442 ! (type).

Shrub with woody branching stem, minutely glandular-pubescent throughout. *Leaves* 5-foliolate; petioles of medial leaves about 2 cm. long; leaflets obovate to rhomboid, acute, sparsely ciliate towards the base with minute bristles, glabrous above, the medial 1·7–2 cm. long, 6–7 mm. broad. *Inflorescence* clothed with small sessile 3-fid bracts; lower flowers scattered; pedicels 1·2–1·5 cm. long. *Sepals* lanceolate, acuminate, densely clothed (or not) with dark purple stalked glands. *Petals* clawed, the 2 larger 1–1·2 cm. long, pink concolorous, the 2 smaller pink in the upper part, yellow below. *Stamens* 14, 4 long fertile, 10 short and with smaller (abortive ?) anthers. *Pod* 6 cm. long over all; stipe 5 mm. long; beak 4 mm. long; valves many-ribbed.

98. **Cleome Nationae** *Burtt Davy*, sp. nov.; *C. maculatae* Burtt Davy affinis, sed foliolis latioribus linearibus vel lineari-lanceolatis, staminibus 6 omnibus fertilibus, capsulis brevioribus, differt.

South Africa. Transvaal: Rustenburg, flg. Jan. 1905. *Nation* 214 ! (type). Portuguese East Africa: Lourenco Marques, *Schlechter* 11516 !

Herb annual, 20–45 cm. high. *Stem* glabrous, branched. *Leaves* 3-foliolate; petiole 1·5–4 cm. long; leaflets 1·5–3 cm. long, 2–3 mm. broad, linear to linear-lanceolate, acute, glabrous above, minutely and sparsely scaberulous on the margins and under-surface. *Pedicels* 1–3 mm. long; flowers 6–9 mm. long. *Calyx* with a short gibbous tube; lobes 2 mm. long, subulate to lanceolate-acuminate. *Petals* truncate, veiny, white or yellowish.

pinkish towards the tips (or pink throughout ?). *Stamens* 6, all fertile. *Pod* (mature) 5–8 cm. long over all, striate ; stipe 3·4 mm. long ; beak 3–5 mm. long. *Seeds* as in *C. maculata* but smaller, dark brown, the transverse crests closer together and less elevated.

Other specimens from Delagoa Bay (e.g. *Monteiro* 42) may belong here, but the petals are longer and pink throughout.

C. Nationae resembles *C. tenuifolia* Kl., but differs in the smaller flowers, shorter stipe, and fewer stamens.

99. **Maerua Legatii** *Burtt Davy*, sp. nov. ; *M. buxifoliae* Gilg et Bened. affinis, sed foliis minoribus dense pubescentibus, petalis 0, differt : a *M. parvifolia* Pax foliorum magnitudine forma et pubescente, et papillarum charactere et positione, differt.

South Africa. Transvaal : Zoutpansberg Distr., Blaauwkop, 660 m. alt., Sept. 1908, *Legat* 46 ! *in S. Afr. Nat. herb.* 4903 ! (type) ; Messina, 600 m., *Rogers* 1930 ! 19345 ! Waterpoort, 650 m., *Rogers* 21510 !

Shrub distinctly pubescent ; branchlets 6–30 cm. long, straight, minutely grey-tomentose, glabrescent in age. *Leaves* densely fascicled, subsessile, simple, 6–10 mm. long, 2–3 mm. broad, obovate to oblanceolate, mucronate, glaucous to green, minutely and densely papillose above, densely tomentose beneath. *Flowers* solitary, axillary ; pedicels 1 cm. long ; receptacle 3–5 mm. long, ribbed. *Sepals* 8 mm. long 3–3·5 mm. broad, green. *Petals* 0. *Androphore* exserted about 1 mm. beyond the receptacle. *Gynophore* about 1·3 cm. long ; young fruit minutely grey-puberulous.

Allied to *M. parvifolia* Pax, but differs in size, shape and tomentose under-surface of the leaves, and the character and position of the papillae.

100. **Hybanthus Thorncroftii** (*N. E. Br.*) *Burtt Davy*, comb. nov. *Ionidium Thorncroftii* N. E. Br., Kew Bull. 1921 : 289.

South Africa. Transvaal : Barberton, on a hillside at Reimers Creek, 1050 m. alt., flowers pale blue, Nov. 1920, *G. Thorncroft* 1086 ! (type).

101. **Polygala producta** *N. E. Brown*, Kew Bull. 1895 : 143, emend. *Burtt Davy*. *P. Rehmannii* var. *parviflora* Chod., Monog. Polygal. 362 (1893). *P. asperifolia* Chod. in Engl. Jahrb. 48 : 323 (1912).

In 1893 Prof. Chodat described *Polygala Rehmannii*, based on *Rehmann* 4635, and a variety *parviflora* founded on *Rehmann* 4565. In 1895 Mr. N. E. Brown published *P. producta*, citing *Galpin* 844, *Rehmann* 4565 and nine other specimens, as belonging to his new species, but without designating any one of them in particular as the type. In 1912 Prof. Chodat, overlooking Mr. Brown's name, redescribed *Galpin* 844 as *P. asperifolia*.

A study of the Kew material of *P. Rehmannii*, *producta* and *asperifolia* shows that all but two of the specimens cited by Mr. Brown under *P. producta* are referable to *P. Rehmannii* (of which the type, *Rehmann* 4635, is not at Kew). The two residual specimens represent a second species. One of them (*Rehmann* 4565) is the type-number of *P. Rehmannii* var. *parviflora*, and the other (*Galpin* 844) is the type-number of *P. asperifolia*. The question now arises, what name this second species should bear. The varietal name *parviflora* is excluded under Art. 49 of the International Rules, and the choice accordingly lies between *P. producta* (1895) and *P. asperifolia* (1912). Under the type-method a specific name stands or falls by its type-specimen, so that it is necessary in the first place to ascertain the type of *P. producta*. Where several specimens were originally cited and none was designated as the type, a type-specimen should be selected in accordance with the following considerations. It should be the specimen on which the original description was based, or which the author had chiefly in mind. This may be indicated by closer agreement with the original diagnosis or description, by manuscript notes left by the author, or sometimes by the specific name. Mr. Brown's description of *P. producta* covers all the specimens cited, and there is no indication on the herbarium sheets as to which was the type. The diagnostic character of the elongated raceme, to which the specific name *producta* refers, is, however, most pronounced in *Galpin* 844, and as this was also the first specimen cited by Mr. Brown it may be chosen as the type.

The same result would be attained by the method of residues, the name *P. producta* being applied to what is left after removal of the material referable to the previously described *P. Rehmannii*, namely *Galpin* 844 and *Rehmann* 4565.

Whenever an author, in describing a new species, cites more than one specimen, it is desirable that he should designate one of these as the type, in order to determine the application of the name in the event of subsequent segregation.

102. **Cerastium capense** *Sond.* in Harv. & Sond. Fl. Cap. 1: 131 (1860).

South Africa. Transvaal: Witwatersrand; in marshy places near Elsburg, Oct. 22, 1893, *Schlechter* 3546! Lydenburg Distr.; Lydenburg, *Wilms* 66! *Rogers* 14571! Bethal Distr.; Bethal, *Pott* 3595! Carolina Distr.; Carolina, *Moss & Rogers* 1063! 1227! Ermelo Distr.; Ermelo, *Burtt Davy* 1863, *Rogers* 14060! Wakkerstroom Distr.; Volksrust, *Mogg* 9726! Also in the Orange Free State, and the Eastern and Western areas of the Cape Province. Sonder cites *Ecklon & Zeyher* 265, 266, 267, and *Zeyher* 1965b from Table Mt. (summit and below), Caledon Baths, Zwartkops River and Adow.

Our material has been variously referred to *C. viscosum* var. *elongatum* Druce, and to closely allied British forms, but neither

Dr. G. Claridge Druce nor Mr. C. E. Salmon will admit it as conspecific with any British species. Mr. Salmon reported of South African specimens submitted to him: "I should say we have *nothing* in Britain that could be called either *C. capense* or *C. arabidis.*"

103. **Cerastium Dregeanum** *Fenzl.* in Ann. Wien. Mus. 1: 341 (1836). *C. brachycarpum* E. Mey. ex Gren., Monog. Cerast. p. 64, t. 6 (1841).

South Africa. Transvaal: Witwatersrand; in damp places near Elsburg, Oct. 22, 1893, *Schlechter* 3537! Lydenburg Distr.; Belfast, 6400 ft. alt., Dec. 1909, *Worsdell*! Carolina Distr.; Carolina, *Rogers* 19788! Orange Free State: Nelson's Kop, in 1862, *Cooper* 1950! Natal: Umzimkulu, *Miss E. Groom in herb. Wood* 1770! Illovo, grassy hill, Apl. 30, 1883, *Wood* 1820! Van Reenen's Pass, 1700–1900 m. alt., Mch. 20, 1894, *O. Kuntze*! Charlestown, Nov. 14, 1913, *Mogg* 9623! Olivers Hoek Pass, Jan. 18, 1886, *Wood* 3559! Basutoland: Leribe, 1500–1800 m. alt., Jan. 1913, *Dieterlen* 935! Eastern Cape Province: Katberg and Los Tafelberg, 1500–1700 m. alt., *Drège*! (types). Transkei: Black Rock Cave, Kentani, *Pegler* 1291! Bazeia, *Baur* 500! Western Cape Province: Western slopes of Orange Kloof, *Wolley Dod* 3503!

This has been referred to the European *C. arvense* L., but as Mr. C. E. Salmon and Dr. G. Claridge Druce point out, the long capsule keeps it out of that species. *C. arabidis* E. Mey., to which specimens have been referred, differs in the oblong to oblong-lanceolate lower leaves, which are ciliate with long (up to 2 mm.) white hairs, and in the narrower, shorter petals.

104. **Sagina maxima** *A. Gray* var. **parviflora** *Burtt Davy*, var. nov.; a *S. maxima* A. Gray habitu humilior, tenuior floribus minoribus differt.

South Africa. Transvaal: Pretoria, *Burtt Davy*; Vereeniging Distr.; Burttholm, Uitgevallen 197, June 1917, a garden weed, *Burtt Davy* 17524! *in herb. Cantab.*

Japan. Yokoska, 1866–74, *Dr. Lud. Savatier* 128!

China. W. Yunnan: Tali Range, lat. 25° 40′ N., in "dry barren situations along the base of the eastern flank," 2100 to 2400 m. alt., Apl.-May, 1906, a plant 1 to 4 in. high, flowers white, *Forrest* 4301! (type); Hu-Pe: Ichang or immediate neighbourhood, *A. Henry* 3652! Manchuria: road between Ninguta and Om̃oso, in the Valley of Ell-dshañ-cho, 20 July, 1896, *V. Komaròv* 616!

Herb annual, with prostrate or ascending diffuse slender stems, about 6 cm. high. *Leaves* glabrous, filiform or subulate to narrow-linear, mucronate, 0·8–1 cm. long. *Pedicels* axillary, slender, 1–2·3 cm. long, glandular-pubescent to glabrescent. *Flowers* small, 2·5–3 mm. long when in fruit. *Sepals* more or less minutely glandular-pubescent, 1·5–2 mm. long. *Petals* shorter than the sepals, white. *Capsule* exceeding the sepals, about 3 mm. long.

Almost certainly introduced into South Africa with roots of *Iris Kaempferi* imported direct from Japan to my garden in Pretoria, and transferred in 1913 to my garden at Burttholm. *S. maxima* has been referred to S. *Linnaei* Presl (*S. saginoides* (L.) Dalla Torre) which differs in its perennial habit, petals much longer than the glabrous sepals, glabrous pedicels, and longer capsule.

105. **Silene Burchellii** *Otth.* in DC. Prodr. 1: 374 (1824). *S. pilosellaefolia* Ch. and Schl. in Linnaea 1: 41 (1826). *S. Thunbergiana* E. and Z. Enum.: 32 (1834). *S. Burchellii* var. *pilosellaefolia* Sond. in Harv. & Sond. Fl. Cap. 1: 128 (1860).

The following note on this species, by the late Dr. Bolus, is preserved at Kew :—" Harvey (in his Flor. Cap. 1: 128) does not quote, and probably had not seen, Burchell's No. 271, which was the type specimen of this species. Consequently he has described from other forms. On the other hand *S. Thunbergiana* E. and Z., founded on their No. 253, is obviously identical with Burchell's No. 271; the last name, *S. Thunbergiana* E. and Z., must therefore be suppressed.

" The forms hitherto commonly marked in Herbaria '*S. Burchellii* Otth.' (see Burchell's Nos. 580, 1254, 6789, and many recent collectors) must, I think, be regarded as a mere variety, with more erect habit, and generally a tendency to narrower leaves, No. 271 being the maritime form, with broader leaves. (See also Gerrard's No. 605 from Natal). These forms are connected by intermediate states, but I can find no differences whatever in the calyx-teeth or fruit.

" Under these varieties and under various names (including *S. chirensis* Rich., *S. sericea* Rich., etc.), this species extends very widely over Africa from the Cape to Abyssinia.—*H. Bolus* ".

The following are referable to the typical form, which is a maritime plant not found in the interior :

South Africa. S.W. Cape Prov. : Cape Div.; Kloof between Lion's Head and Table Mt., on the side towards Camps Bay, *Burchell* 271! (type); Table Mt., steep ascent facing Cape Town, *Burchell* 580! Lion's Head, flg. Sept., *Dr. Pappe*! Lion's Rump, flg. Jul.–Aug. 1846, *R. C. Alexander*! " C.B.S. ", *Dr. Harvey*! Leeuwenberg, below 1,000 ft., flg. Oct., *Drège*! (sub. nom. *S. crassifolia*), *Eckl. & Zeyh.* 253! (type of *S. Thunbergiana*). Eastern Cape Prov.: Uitenhage. flg. Oct., *Dr. Pappe*! Zwartkops Rivier and Adow, *Eckl. & Zeyh.* 257.

var. **angustifolia** *Sond.* in Harv. & Sond. Fl. Cap. 1: 128 (1860). *S. cernua* Bartl., non Thunb., teste Sond. *S. sericea* Rich., non All. *S. chirensis* Rich. teste Oliver.

South Africa. S.W. Cape Prov. : Cape Div.; Simons Bay, *MacGillivray* 662! Table Mt., 700 ft., flg. Sept., *Bolus* 4709! Eastern Cape Prov.: Zwartkops River, *Dr. Pappe*! Algoa Bay, *Forbes*! Grahamstown, *MacOwan* 58! Basutoland:

Leribe, *Dieterlen* 362 ! Orange Free State : Thabanchu, flg. Feb., *Burke* ! *Zeyher* 84 in part (part of type). Natal : without precise locality, *Cooper* 1943 ! Transvaal : Rustenburg, fl. and frt. Jan., *Nation* 223 ! Heidelberg, flg. Nov., *Leendertz* 2517 ! Mooifontein, flg. Oct., *Schlechter* 3560 ! Haenertsburg, flg. Nov., *Pott* 4610 ! Bosch's, near Barberton, 1200 m., flg. Dec., *Galpin* 1270 !

Tropical Africa. S. Rhodesia ! Nyasaland ! Tanganyika Terr. ! Kenya ! Abyssinia ! Eritrea !

Some of the Transvaal material (e.g. *Pott* 4610) is a good match of *Bolus* 4709 from Table Mt. Forms intermediate between this and the preceding, and this and the following, are frequent.

var. **latifolia** Sond. in Harv. & Sond. Fl. Cap. 1 : 128 (1860).

South Africa. Transvaal : Shady places at the Crocodile River, Magaliesberg, in 1841, *Zeyher* 84 in part (type) ; Standerton, flg. Nov., *Wilms* 64 ! Natal : without precise locality, *Gerrard* 605 ! Inanda, *Wood* 393 ! Near Durban, *Wood* 122 !

Tropical Africa. Nyasaland : Shire Highlands, *Buchanan* 3 ! *Adamson* 65 ! Zomba, *Purves* 164 !

106. **Silene gallica** *L.*, Sp. Pl. 417 (1753). *S. anglica* L., *S. lusitanica* L., *S. quinquevulnera* L., Sp. Pl. 416 (1753).

South Africa. Transvaal : not infrequent as an adventive weed in fields of corn and forage.

By European botanists most of the plants bearing the above names are often treated as separate forms, varieties or subspecies.

Under Art. 46 of the International Rules, the name *S. gallica* stands for the typical form, having been retained for the species when *S. anglica* was united with *S. gallica* by Mertens & Koch, under the name *S. gallica* var. *anglica*. Under the " American " code, however, the name *S. anglica* is retained for the typical form, as having " priority of place ".

107. **Garcinia transvaalensis** *Burtt Davy*, sp. nov. ; species a *G. Gerrardio* Harv. affinis, sed sepalis paullo brevioribus, petalis multo majoribus, staminibus longioribus, et foliorum forma magnitudine et nervatione, differt.

South Africa. Transvaal : Barberton Distr. ; Reimers Creek, near Barberton, 1400–1500 m. alt., *Galpin* 1202 ! (type).

Tree 20 ft. high. *Branchlets* 4-angled, the angles more or less winged. *Petiole* thick, about 1 cm. long ; leaf-blades elliptic, acute, mucronate, tapering to the base, 6–7 cm. long, 3–4·5 cm. broad, dark green, glossy, leathery ; secondary veins more or less arcuately curved, 0·6–1 cm. apart ; leaf-margin cartilaginous. *Flowers* terminal on long leafy branchlets, cream-coloured. *Sepals* 2 mm. long, 2·5 mm. broad. *Petals* 6 mm. long, 8 mm. broad. *Filaments* 4-adelphous, the bundles 5 mm. long, their branches many and about 1 mm. long. *Fruit* ?

In comparison with *G. Gerrardii* the leaves are noticeable for the absence of the fine straight tertiary veins, arising from the bases of the secondary veins, which divide the lower leaf-surface of that species into rhombic areoles.

108. **Erythroxylon Brownianum** *Burtt Davy*, nom. nov. *E. monogynum* Harv. in Harv. & Sond. Fl. Cap. 2: 591, non Roxb.

South Africa. Transvaal: Saddleback Mt. near Barberton, on dry hillsides at 900–1000 m. alt., *Galpin* 1134! Also in Natal!

Resembling *E. monogynum* Roxb., but distinguished by the shorter petioles and free styles.

109. **Oxalis Galpinii** *Burtt Davy*, sp. nov.; *O. oligotrichae* Bak. affinis, sed foliolorum forma amplitudineque, epidermidis cellulis majoribus, foliorum marginibus revolutis, foliis paucioribus, petiolis robustioribus, floribus magis numerosis, petiolorum pilis ascendentibus, differt.

South Africa. Transvaal: Barberton Distr.; Umlomati Valley, 1200 m. alt., flg. Sept. 1890, *Galpin* 1010 *in Herb. Kew.*! (type).

Herb perennial acaulescent from a bulbiferous rhizome. *Leaves* 3-foliolate; petioles 6–10 cm. long, pilose with lax hairs which are more ascending than spreading; leaflets ovate, rounded to obtuse from a cuneate base, 2–4 cm. long, 2–3·2 cm. broad, margins narrowly revolute, sparsely ciliate. *Peduncles* 9–11-flowered equalling or exceeding the leaves, pilose; pedicels 1–1·5 cm. long, pilose. *Sepals* pilose, 5 mm. long strongly callosed with about 4 salmon-coloured calli. *Petals* about 1·3 cm. long, bluish or lilac.

Allied to *C. oligotricha* Baker, of Lake Tanganyika, but differing in the shape and breadth of the leaflets, the larger epidermal cells, revolute leaf-margins, lesser degree of hairiness, fewer leaves, stouter petioles, and more numerous flowers, and in the hairs on the petioles being more ascending than spreading.

110. **Drosera madagascariensis** DC., Prodr. 1: 318 (1824). *D. curvipes* Planch. *D. ramentacea* var. *curvipes* Sond.

South Africa. Transvaal: Pretoria Distr.; Magaliesberg, *Burke*! *in herb. Hook.* (type of *D. curvipes* Planch.), *Zeyher*! Waterberg Distr.; Nylstroom River, *Nelson* 293! Geelhout-kop, *Breyer in Herb. Trans. Mus.* 17800! Pietersburg Distr.; Woodbush Hill, *Pott* 4609! Lydenburg Distr.; O'Neill's Farm, *Wilms* 33! Belfast, common in the wet peaty soil of a "pan", flg. Feb., *Burtt Davy* 1311! Middelburg Distr.; Klein Olifants River, flg. Dec., *Schlechter* 4022! Ermelo Distr.; Mavieriestad, *Pott* 5095! Heidelberg Distr.; Heidelberg, *Leendertz* 1064! Swaziland: near Mbabane ?, *Bolus* 11877. Also in Natal, Orange Free State and Madagascar (*Lyall* 123! type).

111. **Drosera Collinsiae** *N. E. Brown*, sp. nov.: *D. madagascariensi* affinis, sed ab omnibus speciebus africanis

australibus foliis late spatulato-orbiculatis, petiolisque longissimis tenuissimis differt.

South Africa. Transvaal: Rustenburg, *Miss Collins* 127 *in Herb. Kew.*! (type).

Herb acaulescent (?), with long wiry roots. *Leaves* forming a basal rosette (sometimes cauline ?), 2·5–5 cm. long inclusive; petiole very long and slender, three to four times the length of the blade; blade 0·8–1·3 cm. long, 0·5–1 cm. broad, spatulate-obovate to spatulate-orbicular, not or but slightly longer than broad, rather abruptly cuneate at base, ciliate-dentate. *Scape* 0·6–1·2 cm. long, very slender, glandular-puberulous on the flowering part, glabrous below; pedicels 0·5–0·9 cm. long. *Corolla* apparently purple (1·2–1·5 cm. diam. ?).

The only specimens seen have long wiry roots as in some of the caulescent species, though they do not show definite evidence of a stem; the petals have collapsed, but apparently the flower does not exceed 1·5 cm. in diameter.

112. **Aristolochia Bainesii** *Burtt Davy*, sp. nov.; *A. albidae* Duch. affinis, sed perianthii labellis brevioribus obtusioribusque, racemorum breviorum floribus paucioribus, et foliis majoribus acuminatis, differt.

South Africa. Transvaal: Pietersburg Distr. ?; "South African Goldfields", *Baines in Herb. Kew.*! (type). Reported also from the Zoutpansberg District.

Tropical Africa. Nyasaland: Ntondwe, in 1894, *K. J. Cameron in Herb. Kew.*!

Climber, shrubby. *Stem* and branches angular sulcate, glaucescent and glabrous, slender. *Petiole* about 1·5 cm. long. *Leaf-blades* 6·5–7 cm. long, 4·5–5 cm. broad at base, ovate, deeply cordate, acuminate, 7-nerved, green and smooth above, prominently reticulate and slightly roughish and glaucescent beneath. *Racemes* axillary, 4-5-flowered; bracts foliaceous, ovate-cordate, obtuse, up to 2 cm. long and 1·7 cm. broad, resembling the leaves in texture and reticulation; pedicels 3 cm. long. *Perianth* about 3·1 cm. long; labellum 1·8 cm. long, about 0·5 cm. broad, the margin slightly undulate. *Capsule* about 8 cm. long including the 3·5 cm. long stipe, opening upwards (from the basal attachment towards the apex). *Seeds* much compressed, triangular, acuminate, 1·3 cm. long, 0·9 cm. broad, margined and with 2 prominent ridges, the margin 2·5–3 mm. broad.

Allied to *A. albida* Duch., of Upper Guinea, differing in the shape and relative length of the labellum, the shorter and fewer-flowered racemes, and the more acuminate leaves. *A. Petersiana* Klotzsch, to which it has been referred, differs in the longer labellum and the more obtuse leaves which are not prominently reticulate beneath.

113. **Dioscorea Junodii** *Burtt Davy*, sp. nov.; *D. rupicolae* Kth. affinis, sed racemis compositis, foliorum lobis centralis

brevioribus latioribusque, nervis non reticulatis subtus minus prominentibus, petiolis longioribus, staminibus 6, differt.

South Africa. Transvaal: Pietersburg Distr.; Valley of Schambock's Stadt, near Shilouvane Sanatorium, flg. Jan.–Feb., *Junod* 1416 ! (type).

Stems 3–4 m. long, very slender, twining, glabrous, finely ridged. *Leaves* alternate; petiole 1·7–2 cm. long, slender; blades simple, truncate- (or very shallowly cordate-) hastate, glabrous, about 4·5 cm. long and 5 cm. broad, distinctly but shallowly 5-lobed; central lobe about 3 cm. long by 2.5 cm. broad, acutely pointed but scarcely mucronate, narrowing at its base, 3-nerved from base to apex; lateral lobes spreading, each usually with a small lateral lobe on the lower side; nerves not prominent nor reticulate. *Male flowers* in compound racemes, solitary in the leaf-axils, about 5 cm. long; lower flowers of the raceme 2–3 on a common peduncle 2–3 mm. long, the upper often solitary; rhachis and peduncles more or less winged or angled. *Bracts* longer than the peduncles; bracteoles about equalling the very short pedicels. *Perianth* shortly campanulate, about 9 mm. diameter when expanded; tube 1 mm. deep; lobes 4 mm. long, acuminate, dotted with yellowish-brown glands. *Stamens* 6. *Female flowers* and *fruit* not seen.

114. **Dioscorea (Testudinaria) brevipes** *Burtt Davy*, sp. nov.; *D. sylvaticae* E. Mey. affinis, sed pedicellis brevioribus, floribus minoribus et perianthii segmentis angustioribus, differt.

South Africa. Transvaal: Waterberg Distr.; Potgietersrust, flg. Nov. 1908, *Leendertz* 1510 ! (type); Pietersburg Distr.; Forest of Marovougne, near Shilouvane, flg. Jan., *Junod* 857 ! Lydenburg Distr.; in bush at the river near Lydenburg, flg. Feb., *Wilms* 1496 ! Barberton Distr.; among rocks, hillside near the Edwin Bray Battery, Barberton, 660 m. alt., flg. Nov., Dec., *Galpin* 1185 ! Orange Free State: near Harrismith, flg. Jan., *Sankey* 314 ! Natal: Greenwich Farm, near Rietvlei, flg. Dec., *Harold Fry* ex *herb. Galpin* 5727 !

Stems 1–2 m. long, moderately stout to slender, twining, glabrous, slightly compressed and distinctly ridged. *Leaves* alternate; petiole 1·1–1·5 cm. long, shallow-channelled above; blades simple, cordate-hastate, glabrous, glaucous beneath, 3·2 (or less)–4 cm. long (from apex of petiole to apex of leaf), 3·9–5·8 cm. broad at base, distinctly but shallowly 3-lobed; central lobe abruptly or gradually tapering into a mucro 1·5–2·5 mm. long; lateral lobes widely divaricate from the petiole, rounded and quite entire; nerves 9, more or less prominent beneath. *Male flowers* in simple spike-like racemes, solitary in the leaf-axils, 5–7 cm. long; rhachis and peduncles narrowly ridged or angled. *Bracts* shorter than the pedicels, bracteolate at apex, the bracteole shorter than the perianth-tube. *Pedicels* about 2 mm. long. *Perianth* campanulate, 3–4 mm. diameter; tube about 1·5 mm. deep, dark purplish-brown; lobes about 2 mm. long, 0·7 mm. broad, purplish below, pale yellow above.

Stamens 6. *Female flowers* in axillary racemes; pedicels about 2 mm. long, 4 mm. apart; ovary about 3 mm. long and perianth-lobes about 2 mm. long (only unopened buds seen). *Fruit* not seen.

115. **Dioscorea Brownii** *Schinz* in Mem. Herb. Boiss. No. 20: 11 (1900). *D. Tysonii* Schoenl. in Rec. Alb. Mus. 1: 49 (1903); non *D. Tysonii* Baker in Journ. Bot. 18: 2 (1889), Fl. Cap. 7: 252 (1896).

South Africa. Griqualand East: Zuurberg, *Tyson* 1829! (type).

Both of the above specific names were established on the same type-specimen, with simple, entire leaves. *D. Tysonii* Baker has a compound leaf of 5 leaflets and was founded on *Tyson* 1646, from the vicinity of Fort Donald, Griqualand East.

116. **Dioscorea cotinifolia** *Kunth*, Enum. Pl. 5: 386 (1850). *D. malifolia* Baker in Journ. Bot. 18: 1 (1889); Fl. Cap. 7: 248 (1896).

South Africa. Transkei: Tembuland; Morley, 300–600 m. alt., *Drège* 4500! (type of *D. cotinifolia* Kth.; also cited by Baker as part of his *D. malifolia*). E. Cape: Kentani, in woods, climbing about 8 ft., flg. Jan., *Pegler* 739! 1812! Bathurst Div.; between Rietfontein and Kowie River, *Burchell* 4001! Also in Natal and Transvaal.

117. **Zantedeschia melanoleuca** *Engl.* var. **concolor** *Burtt Davy*, var. nov.; a forma typica foliorum maculis minoribus paucioribusque, spatha concolore, differt.

South Africa. Transvaal?: Without precise locality, the type grown from tubers imported by Messrs. F. Sander & Co., St. Albans, in, or before, 1898; Lydenburg Distr., without precise locality, flowered in 1905 by C. G. van Tubergen, Jr., Haarlem, Holland, from tubers received "a few years" previously.

Messrs. Sander and Co. received the plant from South Africa with the statement that it is "a hybrid between *Richardia Elliottiana* var., and a South African species with creamy bell-shaped flowers with a broad purple centre" (*R. melanoleuca* ?). The term hybrid may have been used here in a loose popular way to designate a variation or sport; it is very doubtful whether there were any hybridists dealing with Zantedeschias in South Africa at that time. Mr. van Tubergen states in a letter preserved at Kew that his plant "reproduces itself perfectly true from seeds. It is deciduous and loses its foliage in the autumn".

Z. melanoleuca was figured in Bot. Mag. t. 5765. Our plant differs in the fewer, smaller and more irregular white spots on the leaves and the absence of the purple blotch at the base of the spathe within. Fresh material may show further and specific differences between the two.

118. **Zantedeschia oculata** (*Lindl.*) *Burtt Davy*, comb. nov.; *Calla ? oculata* Lindl. in Gard. Chron. 1859: 788. *Richardia hastata* Hook. f. in Bot. Mag. 16 (Ser. 3), t. 5176 (1860). *Zantedeschia hastata* Engl., Jahrb. 4: 64 (1883).

South Africa. Natal: Without precise locality, *Sanderson* ! *Wood* 2 ! Near Maritzburg, fl. Oct. 1883, *Wilms* 2335 ! Basutoland, in 1861, *Cooper* 3327 ! Transvaal: Lydenburg, at the river, fl. Jan. 1895, *Wilms* 1574 ! Barberton Distr.; swamps in the Umlomati Valley, 1200 m. alt., fl. Dec. 1891, *Galpin* 1360 !

The original description was drawn from a specimen imported from Natal in 1857 by Messrs. Veitch, in whose nurseries at Exeter the plant proved hardy. Messrs. Veitch's correspondent described the plant as "a yellow Calla, which, from its smallness and beauty and being also hardy, will be much prized. You must not give too much water; it grows here in stiff marl and sand on high ground under shade, consequently merely damp soil". Lindley describes the flower as "a clear rich yellowish green, with a deep purple eye". Galpin terms it "cream-colour with brown centre", and the plant as growing "in swamps". Cooper describes the bottom of the spathe inside as "purple".

119. **Zantedeschia Elliottiana** (*Knight*) *Burtt Davy*, comb. nov. *Calla Elliottiana* Knight ex W. Wats. in Gard. Chron. 12, Ser. 3, 123 (1892). *Richardia Elliottiana* Hort. ex Mottet in Rev. Hortic. 67: 38 (1895); E. de Duren in Rev. Hort. Belg. 23: 13 cum tab. (1897); Hook. f. in Bot. Mag. t. 7577 (1898).

South Africa. Without precise locality: grown from seed received from "South Africa" in 1886, *Knight*. Transvaal: Wakkerstroom Distr.; near Amersfoort, flowering Nov. 1895, *Burtt Davy* 4095.

Described as being the largest species of the genus hitherto known. At first considered to be "perhaps a variety of *R. albomaculata*", a species which belongs to the hastate-leaved group, and has a relatively small spathe, white with a purple blotch within, with a limb much longer, narrower and more tapering than that of *Z. Elliottiana*. The latter differs from *R. angustiloba*, the other golden-spathed species, in its "much larger size, broad spotted leaves more deeply cordate at the base, the smooth surface of the limb of the spathe within, and the absence of purple colouring at its base; also in the large ovaries and sessile stigma".

120. **Zantedeschia Sprengeri** (*Comes*) *Burtt Davy*, comb. nov. *Richardia Sprengeri* Comes in Atti Inst. Incorazz. Napoli, Ser. 5, vol. 3, No. 7; Bot. Centralbl. 89: 660; N. E. Brown in Gard. Chron. 31: 349 (1901), 32: 350 (Nov. 15, 1902).

Petiole 15–17·5 cm. long, smooth, without bristles at the base; blade 20–22·5 cm. long, 7·5–8·5 cm. broad, oblong, acute at the apex, truncate (not hastate nor cordate) at the base, green, marked with semi-transparent white spots, and sometimes variegated as well with white. *Peduncle* 30–35 cm. long, smooth, glabrous. *Spathe* broadly funnel-shaped, bright clear yellow, varying to sulphur-yellow or white, or sometimes spotted; when flattened out measuring 10–10·5 cm. long (exclusive of the 1·2–1·8 cm. long subulate cusp), and 12·5–13 cm. in breadth, somewhat transversely rhomboid-ovate or rhomboid-orbicular in outline. *Spadix* shortly stipitate, not half as long as the spathe. *Ovaries* without neuter organs mingled with them, somewhat 4-angled, with sinuous sides as viewed from above, flattened at the top: stigma sessile. (*N. E. Brown.*)

South Africa. Transvaal: without precise locality, *Hort. Sprenger.*

Mr. Brown describes this as a fine and distinct species, introduced from the Transvaal in the winter of 1898 by Mr. C. Sprenger of Naples, and first flowered with him in the summer of 1900. It is one of the yellow-flowered group, "rivalling *R. Pentlandii* and *R. Elliottiana*" in colour, and has equally large if not larger spathes, differing from those and all other species in the form of its leaves and the broader, funnel-shaped, or somewhat trumpet-mouthed spathes, which, when flattened out, are broader than those of any other species.

XXV.—THE FLORA OF MADRAS: V.

The fifth and sixth parts (pp. 769–1160), *Ebenaceae* to *Plantaginaceae*, completing the *Gamopetalae*, have now been published, and Mr. Gamble has drafted the following notes on continuation of those previously published.*

Notes on the Flora of Madras.

J. S. Gamble.

Part I.—Dipterocarpaceae.

Page 82 *Hopea.* Specimens received from India, from the Forest Research Institute, Dehra Dún, show that Wight and Arnott, quite correctly, separated *H. glabra* from *H. Wightiana* Wall., as was rightly maintained in the "Flora of British India". A new species of the genus, *H. canarensis* Hole in Ind. For. xliv. 578, was published in Dec., 1918, and forms the subject of a note in "Indian Forest Records", Vol. vii. with plate. It is allied to *H. racophloea* Dyer and has the same glands in the nerve axils of the leaves, and broader wings to the fruit. It is found in the Hills of the W. Gháts, on the boundary line between S. Canara and Mysore. Vern. *Kan.* Malai haiga. A large tree with clean bole reaching 60 ft. and a girth of 6–8 ft.

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[*] See *K. B.* 1916, p. 57; 1918, p. 222; 1920, p. 49; 1921, p. 312.

ICACINACEAE.

Page 198 *Pyrenacantha*. This interesting plant now, from specimens recently available, proves to have a wider range than was before recorded, viz.: E. Gháts, Hills of Vizagapatam at 3000 ft. (*A. W. Lushington*); Carnatic, in N. Nellore (*Fischer*), in addition to those already mentioned.

Part III.—ONAGRACEAE.

Page 516 *Jussieua*. According to Ridley in Journ. Bot. LIX., 257, *J. suffruticosa* Linn. should be subdivided into :—

(i) *J. suffruticosa* Linn. Kuthuparamba in Malabar (Coll. *K. Rangachari*)—*J. fissendocarpa* Haines in Journ. As. Soc. Beng. xv. (1919) 313, t. ix.

(ii) *J. villosa* Lam. Plains country on both sides of the Peninsula, in wet places, common.

(iii) *J. speciosa* Ridl. l.c., a tall herb with large flowers and capsule and densely softly tomentose leaves, found in swampy places in Wynaad at about 3000–4000 feet (*Beddome, Gamble, Bourne*).

I am glad to put this on record as, when working on the genus, I was much in doubt about the large-flowered plant and ought myself to have made the separation now so properly made by Mr. Ridley. *J. speciosa* is a very distinct and handsome species.

Part V.—SOLANACEAE.

Page 932 *Solanum*. The "Fl. Br. Ind." keeps distinct No. 8 *S. bigeminatum* Nees and No. 9 *S. laeve* Dunal, but I can find no difference that would warrant the separation. The earliest described species was *S. laeve* Dunal; Solan. Syn. 22 (1816), afterwards transferred by him in DC. Prodr. xiii. 1, 408 to *Bassovia ? laevis* Dunal. Trimen in Fl. Ceyl. iii. 231 included both the species of the F.B.I. under *S. laeve* Dunal and I think he was right because, even in the F.B.I., Clarke allowed that the calyx of *S. bigeminatum* might be "entire or obscurely toothed". Trimen considers the *S. denticulatum* Bl., No. 10 of F.B.I., to be a variety of *S. laeve*, but it seems to me to be easily distinguished, certainly in the Herbarium. Trimen's Plate is not a good picture of an average *S. laeve* !

Part VI.—LENTIBULARIACEAE.

Page 978 *Utricularia*. I should have found this genus extremely difficult if the whole of the Indian specimens at Kew had not been recently arranged by Dr. Stapf and identified with the sheets of the Vahl collection lent by the authorities at Copenhagen and with those of the type collection of Wight's Herbarium lent by the authorities at Glasgow. I have followed Dr. Stapf's arrangement as closely as possible and have named the Calcutta and Madras specimens accordingly, also those of the Edinburgh Herbarium so kindly lent by Prof. Wright Smith. It is much to be hoped that Indian collectors will disentangle their specimens carefully in future so that the characters of the leaves and the little bladders may be recorded and if possible carefully drawn. Very few of the sheets of the collections dealt with had any notes on these points, and even notes of the colours of the flowers were almost invariably wanting.

GESNERIACEAE.

Page 984 *Æschynanthus.* I have adhered to the better-known generic name, though *Trichosporum* D.Don is older and has been adopted in the " Natürlichen Pflanzenfamilien." In the new Volume CXLVIII. of the Botanical Magazine, Dr. Stapf in Plate 8938 has retained *Æschynanthus* and it seems quite likely that, if the list of " nomina conservanda " is revised, it will be included in it. I have made two species of the S. Indian material with some doubt, for I think that Dr. Cooke in the Bombay Flora may have been right in considering that there was only one species in S. and W. India and Ceylon, *Æ. Perrottetii* A. DC. including *Æ. ceylanica* Gardn.

Page 985 *Didymocarpus.*—I have followed other writers of local Indian Floras in keeping up this genus instead of combining it, as is done in the " Pflanzenfamilien", with *Chirita* and others in a genus *Rottlera.* The identification of the species found in S. India for the most part depends on that of *D. Rottleriana* Wall., the type of which is in the Wallich Herbarium under No. 778. It is rather confusing that in the Fl. Br. Ind. C.B. Clarke maintained *D. tomentosa* Wt. as a separate species while in the " Monographiae Phanerogamarum, Vol. v." he makes it a variety of *D. Rottleriana.* In my opinion it is a species distinct not only morphologically, but also geographically, and I have kept it so and I have also kept distinct, as I think they are, *D. lanuginosa* and *D. Wightii.* As in many other similar difficult genera, the absence of notes on colour of flower, habitat, elevation of locality, etc., is a great hindrance to work on them, and for the S. Indian species there is an absence of good drawings such as are available for those of N. India.

BIGNONIACEAE.

Page 997 *Stereospermum.* I have followed Mr. Haines (*Kew Bull.*, 1922, p. 121, and " Botany of Bihar and Orissa ", p. 655) in changing the name usually given to the tree known as *S. chelonoides* to *S. tetragonum* DC. I have seen no specimens that can be identified completely with the *Bignonia chelonoides* of the Linnean Herbarium, as investigated by Mr. Haines. It is supposed to have been collected at Tranquebar by Koenig, but Tranquebar is not near any forests, I think, in which it is likely to have been found, and I doubt if it really came from the Madras Presidency area.

ACANTHACEAE.

Page 1010 *Nelsonia.* Lindau in the "Natürlichen Pflanzenfamilien" gives *N. brunelloides* O. Kze. as the oldest name for the plant usually known as *N. campestris* R. Br. I have, however, thought it better to follow Dr. Cooke and retain the name *N. campestris.* The picture by Lindau does not seem to me to represent the Indian plant, especially as regards the length of the spikes, the size of the leaves, the anthers and, above all, the seeds.

Page 1021 *Micranthus.* I followed Dr. Cooke and Mr. Haines in adopting this generic name, having overlooked the fact that *Phaylopsis* had been admitted as a "nomen conservandum."

Page 1023 *Eranthemum.* I have followed the "Natürlichen Pflanzenfamilien" in reverting to this name instead of describing the genus as *Daedalacanthus*, as has been done in the Fl. Br. Ind. followed by other Indian authors. The whole question was clearly explained by Dr. Stapf in 1909 in the letterpress to Bot. Mag. t. 8239 (*E. Wattii* Stapf). The plant on which Linnaeus described the genus is explained to have been a Ceylon one, which by some confusion he called *E. capense.* It is the *E. montanum* of Roxb. (*Daedalacanthus montanus* T. And.; F.B.I. iv. 421). I have thought it best to adhere to the later specific name, that of *capense* being so inappropriate. The plants referred in the Fl. Br. Ind. to *Eranthemum* will now come under the generic name of PSEUDERANTHEMUM Radlk.

Page 1025 *Strobilanthes.* This large and very interesting genus was subdivided by Mr. C. B. Clarke in the "Malay Materials" and elsewhere into several genera characterised chiefly by the pollen grains. As an old Indian field worker I felt that the use of these characters would be most difficult for botanical investigators, who can only very rarely have with them the necessary appliances for their study, and I am sure that they will take as a kindness that I have endeavoured in my analyses and descriptions to avoid the difficulty, and have adhered to the arrangement of the genus followed in the "Flora of British India." It is a remarkable thing that nearly all the 46 species which I have admitted are endemic to the Madras and Bombay Presidencies. One species only, *S. jeyporensis*, is given by Mr. Haines as occurring in the Bihar and Orissa region to the north, though it is quite likely that the North Indian *S. auriculatus* may also come down to the Ganjam forests, where I think I have seen it, though I have seen no specimens collected by anybody. Nine species are common to both Madras and Bombay. As is well known, most of the species of the genus flower, and then usually gregariously, only at long intervals, and I have indicated, as briefly as I could, the chief recorded flowering years. For most of the species, however, many flowering years must have passed by without any collection of specimens being made, and this is unfortunate.

Page 1062 *Asystasia*. It has been by no means easy to deal with the specimens of this genus, for they dry very badly, and good notes on colour, elevation of locality, climate, etc., are very conspicuously wanting. Practically, however, the species arrange themselves fairly well geographically. All the same, *A. chelonoides* var. *quadrangularis* is not easily distinguished from the common usually coast species *A. gangetica* on the one hand and the rain-belt species *A. violacea* on the other.

Page 1075 *Justicia*. The arrangement and analysis of the species of Sect. 6 *Rostellularia* has been as difficult for me as it has been for previous workers. C. B. Clarke in the Fl. Br. India mentions that by Dr. T. Anderson they were " collected under 3 or 4 ill-defined species," and that consequently he was himself obliged " to arrange them in more species or reduce them to vars. of one." Actually, out of the S. Indian material he has admitted 6 species, but in most of them he has made several varieties. The large series of specimens which I have been lent for my use from various Herbaria has allowed me to arrange the species and varieties somewhat differently, and I have thought it well to revert to the opinions of Nees and other previous writers and to treat some of the varieties as species. I cannot say that I am quite fully satisfied with the result, but I think that my arrangement brings better together the shrubby ones as distinct from the herbaceous and the high-level ones as distinct from those which are found only in the plains. The characters afforded by the comparative size of the bracts, bracteoles and calyx-lobes are not always quite reliable, nor are those given by the presence or absence of pectinate hairs on and the scabrousness of those organs.

XXVI.—MISCELLANEOUS NOTES.

Captain N. G. Ball.—We learn that Captain N. G. Ball, M.A., Assistant to the Professor of Botany, Trinity College, Dublin has been appointed by the Secretary of State for the Colonies Professor of Botany and Director of Biological Laboratories, University College, Ceylon.

Lieut. A. J. Wakefield, B.Sc., has been appointed by the Secretary of State for the Colonies District Agricultural Officer, Tanganyika Territory.

Professor J. E. B. Warming.—It is with great regret that we learn of the death of Professor Johannes Eugen Bülow Warming on April 2nd at Copenhagen, in his 83rd year. Warming was Professor of Botany and Director of the Botanic Gardens at the University of Copenhagen from November, 1885, to December, 1911, being succeeded by C. Raunkiaer, who in turn has been succeeded by C. H. Osterfeld. For over half a century Professor Warming has been a contributor to our knowledge of plants, and most of his work is of a high standard of scientific merit. His phytogeographical and taxonomic studies are well known, but it is in connection with the younger subject of ecology that his name will be most remembered. His "Oecology of Plants" (English translation by Percy Groom and I. B. Balfour, Oxford, 1909) originally appeared in 1895 under the title "Plantesamfund", based upon lectures delivered to his students in the University of Copenhagen. Few botanical works of recent years have had a wider influence. The latest edition, under the title "Pflanzengeographie," by Warming and P. Graebner, appeared in 1918. He also published important works on the vegetation of Brazil (Lagoa Santa), Greenland, the Faeroes, and Denmark.

Professor Warming was a valued correspondent of Kew for over forty years, and visited the Herbarium many times during 1908 when he attended the Darwin-Wallace celebrations of the Linnean Society.

Strychnos cinnamomifolia *Thwaites* var. **Wightii** *A. W. Hill.*—Seeds were recently sent to Kew by Mr. F. Bourdillon, late of the Indian Forest Service; they were collected in Travancore by the Conservator of Forests. An analysis, kindly undertaken by Prof. Henry Greenish of the Pharmaceutical Society, is supplementary to that published in the *Kew Bull.*, 1917, p. 195, when the seeds were found to contain 2·07 per cent. of Brucine and a very small percentage of Strychnine. The analysis of the Travancore seeds also shows Brucine to be in the greater proportion (2·231 per cent.), while Strychnine occurs in only the comparatively small quantity of 0·342 per cent. It is probable that these seeds belong to the var. *Wightii* A. W. Hill, while the former, supplied by Mr. T. Petch from Ceylon (*K.B.* 1917, p. 194), are those of the type. In the seeds of "Nux-vomica" (*Strychnos Nux-vomica* Linn.), which is confined in a wild state to India and Ceylon and is the most important official source of Strychnine, the total alkaloids have been found to vary considerably, averaging about 2·5 or 3 per cent. But the value as a medicinal standard of the total alkaloids may be somewhat nullified by the variation in the proportion of Strychnine to Brucine. A favourable yield of the more valuable alkaloid Strychnine is 1·25 per cent., and the total alkaloids as shown above for the seeds of *S. cinnamomifolia* var. *Wightii* amounts to 2·573.

The type species native of Ceylon and the variety found in Southern India and Assam are both large climbers. (See *Kew Bull.*, 1917, pp. 194–196.)

J. H. H.

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ROYAL BOTANIC GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

No. 7] [1924

XXXI.—NOTES ON THE PLANTS OF PATOS.

R. O. WILLIAMS.

Patos is a small island one mile and a quarter long by nearly a third of a mile broad at its widest part. In area it approximates to one hundred and seventy acres. It is attached to the Colony of Trinidad and Tobago, and is situated in the Gulf of Paria six and a half miles within the Boca Grande or Dragon's mouth. It is about two and three-quarter miles from the coast of Venezuela, and twenty-four miles from Port of Spain. The nearest island also associated with Trinidad is Chacachacare, about seven miles distant.

The climate of the adjoining Bocas islands is dry, the rainfall of Chacachacare being about fifty inches per annum. There is no rain gauge at Patos, but judging from conditions there, and from the type of vegetation, as well as from general information available regarding the island, it must be even drier than Chacachacare. The island is generally very rocky, and the soil poor and of a sandy nature. It is also hilly, the highest ridge being 350 feet above the sea level.

Patos is uninhabited except for two men whose duty it is to see that the British flag is hoisted daily on the flagstaff. In the moister months of the year, viz., July, August, and September, these men are able to grow some food crops such as corn and yams, but at the time of our visit, March 17th to 21st, 1924, which was the height of the dry season, there were no crops growing or attempts at cultivation.

The island is chiefly surrounded with precipitous cliffs, but on the southern side there are two little bays, either of which makes easy landing. Close to the water's edge in the more westerly of these two bays is situated the caretaker's hut, and much was my surprise on a previous visit in 1917 to find a fairly good specimen of the Baobab tree (*Adansonia digitata* L.) growing near by. This, I was told, had been planted by a

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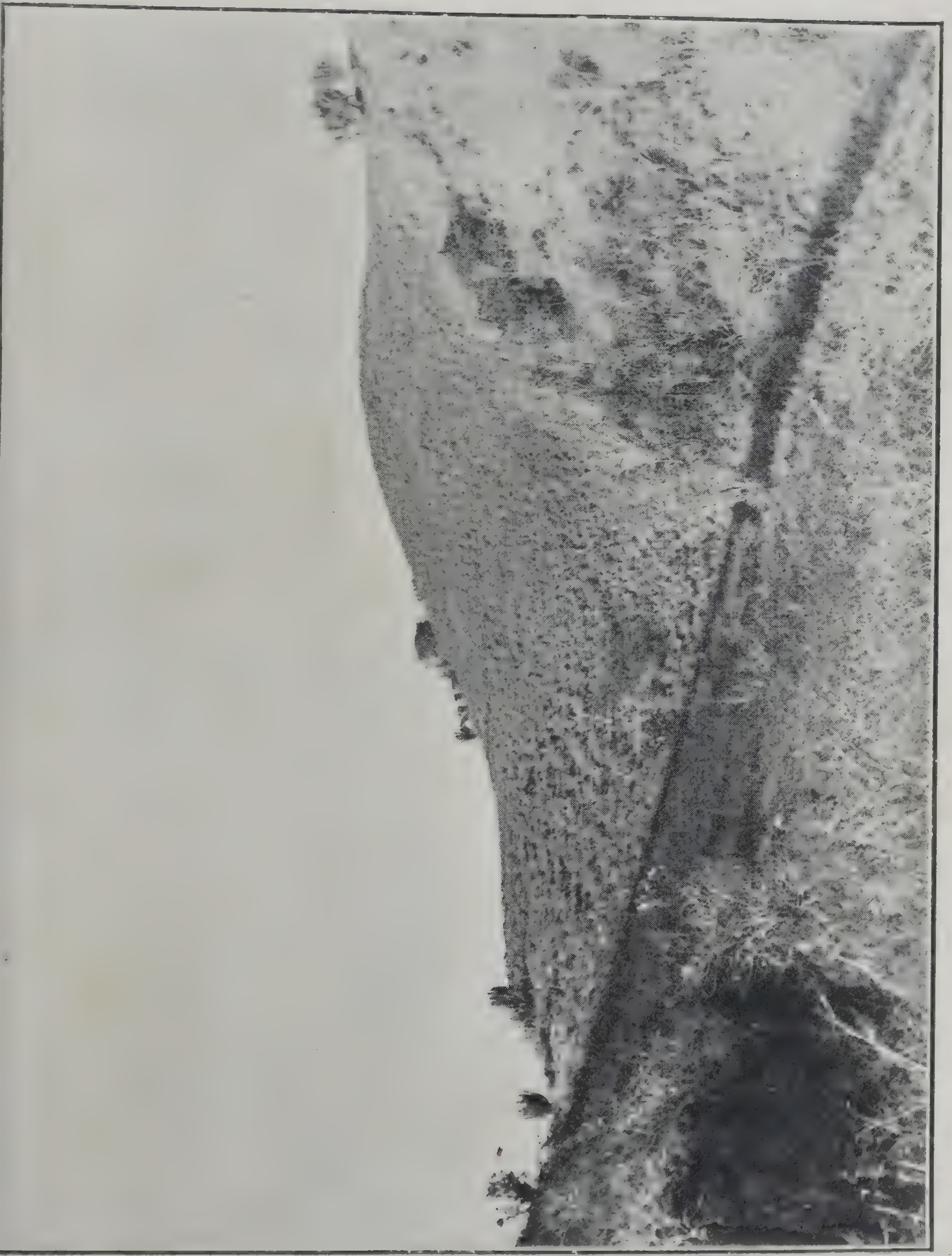
previous proprietor or warden, and probably came from the Botanic Gardens in Port of Spain. This tree is still there and has grown considerably. It is interesting to find an introduced tree on an outlying island, especially when three only of the same species are known to exist in Trinidad. A few coconut palms (*Cocos nucifera* L.) also grow near the water's edge in this bay, one very poor specimen of the lime tree (*Citrus medica* var. *acida*), a calabash tree (*Crescentia Cujete* L.), and the Barbados aloe (*Aloe vera* L.). Other than these no cultivated plants were seen.

Patos is a barren island on which cacti, terrestrial Bromeliads and an *Agave* form quite fifty per cent. of the flora. In fact the purpose of our visit on this occasion was to make Patos a collecting ground for these plants for planting in the West Indian Garden at the British Empire Exhibition and also at Kew. Quite close to the sea we observed in places the Manchineel (*Hippomane Mancinella* L.), a well-known Euphorbiaceous tree with poisonous milky sap ; this was noticed to be bearing its small inconspicuous monoecious flowers. The white mangrove (*Laguncularia racemosa* Gaertn.) was also observed in places on the coast, and in one instance we noticed long structures like paper bags which we took to be birds' nests suspended from the branches. Mr. Urich determined these as the nests of Bombycine gregarious caterpillars from which the moths had already issued. *Sesuvium Portulacastrum* L. was also abundant in places near the shore.

The island is almost entirely covered with bush from twenty-five to thirty feet high except for a few acres in tall grass (Plate I). Interspersed with the bush are many kinds of cacti, the most conspicuous of all being *Lemaireocereus griseus* (Haw.) Britt. & Rose, which is scattered all about the hillsides down to the sea. This plant branches considerably, especially when injured by cutting or breaking, the branches being usually eight-angled and erect. The areoles are about one inch apart, and bear usually ten or eleven greyish spines of varying length up to about half an inch. In old specimens the plant forms quite a distinct main trunk which loses its angular nature and is brownish in colour. The flowers are two or three inches in length, and are borne towards the tops of the branches ; the petals are greenish yellow, the outer ones tipped with red. The fruit is round and very spiny, not unlike a sea egg in general appearance. On ripening, the spines fall and it becomes red in colour, containing edible red pulp and a large quantity of tiny black seeds. The pulp is of good flavour, especially when iced ; bats and birds are very fond of it. On the occasion of our visit in June, 1917, quantities of these fruits were ripe, but during our recent visit very few were found although there were large numbers of immature ones. Dr. Britton in Bull. Dept. Agric. Trinidad, xix, p. 86, regards Patos as the most eastern known station for this species, and states that it ranges along the Venezuelan

PLATE I.



[*To face page* 274

PLATE II.

To face page 275]

coast, occurring on Margarita Island and on the Dutch Islands, Aruba, Curacao, and Bonaire ; it is cultivated in many parts of tropical America northwards to Mexico. Occasionally this plant develops a distinctly red coloration of the stems and gives quite a pretty general effect even from some distance. There is no apparent reason for this, as this form was found scattered about the island amongst the typical *L. griseus*, and also occurs quite close to the sea.

Another fairly common cactus which forms quite large plants almost equal in size to the former is *Cephalocereus Moritzianus* (Otto) Britt. & Rose, a plant readily distinguished by its branches terminating in white woolly apices, the woolly substance sometimes extending down the branches for a distance of one or two feet (Plate II). Young specimens of this plant are very pretty, standing as they do perfectly erect and unbranched, somewhat widely separated in groups amongst the undergrowth. This species also is armed with formidable short spines of which there are about ten to each areole, often many more. The stem is eight-angled, and the areoles are about half-an-inch apart. It is not such a common plant on Patos as *L. griseus*.

To reach the flagpole from the bay one trails up and down a steep track over one ridge to the top of the one beyond. On the first ridge we erected our sleeping quarters by securing the lids of packing cases to horizontal rods nailed to four conveniently placed small trees. For our bed we made a bench of rods on top of which we placed a bed of dry grass, quantities of which were found amongst the bush near by. The grass appeared to be Guinea grass (*Panicum maximum* Jacq.), but it was too dried up to make a proper diagnosis. The trees used for uprights we were told by the men were known as "Greenheart", but it was apparently an entirely different plant from the S. American "Greenheart" (*Ocotea Rodiei* Mez.). The tree was just bursting into growth, but no flowers were found [Herb. No. 10713, not identified].

Our first work was to clear the undergrowth, which in this situation consisted almost entirely of *Opuntia Boldinghii* Britt. & Rose (Plate III). Although the branches were succulent and easily cut, the roots and older stems of the plants proved very tough. We saw much of this plant in flower, the flowers being shaded pink and yellow and rather showy. It is almost devoid of spines, but the areoles bear numerous stiff hairs or bristles which prove very troublesome if the plant is handled without leather gloves. The fruit is round, longer than broad, about one inch in diameter and containing red pulp and flattish, rather large, black seeds. It is edible but cannot be compared as a dessert fruit with *Lemaireocereus griseus* on account of the difference in the size of the seeds. The fruit also produces large quantities of tiny bristles.

Closer scrutiny amongst the Opuntias in this vicinity showed one possessing orange-coloured spines of varying length up to two inches, several being borne on each areole; but unfortunately it was not found in flower. It was not nearly so common as *O. Boldinghii*, and we had to be content merely to collect cuttings for sending to the British Empire Exhibition [Herb. No. 10732, possibly *O. Wentiana* Britt. & Rose].

Following the trail to the flagpole one finds amongst the undergrowth large quantities of a slender usually seven- to nine-angled cactus densely covered with spines of varying length up to one inch. The areoles are about one-quarter of an inch apart. This is *Cephalocereus Smithianus* Britt. & Rose. It is usually erect, growing to a height of ten to twelve feet, often more or less trailing and rooting where its branches touch the ground, throwing up more branches and forming an almost impenetrable thicket.

Before the top of the ridge is reached the track widens out and the bush becomes a little higher. A few fair-sized trees of Gommier (*Bursera gummifera* L.) were seen. On the edge of the clearing around the flagpole are to be found a few plants of the large erect cactus (*Cereus hexagonus* L.). The individual branches of this species are by far the largest of any cactus we found on Patos. The specimens we collected were four-angled, and the tops of the branches were almost spineless, although at the base long, slender spines are developed and the stem was noticed to be five-angled. This plant was far from common, and except for the few plants found around the flagpole only two or three other specimens were seen.

Cactus caesius (Wendl.) Britt. & Rose, the Turk's Cap Cactus, is found plentifully on Patos, and this was one of the principal reasons for making Patos the collecting ground for cacti for the British Empire Exhibition (Plate IV). It has not been recorded from any of the other Bocas Islands: I have personally searched some of the barren parts of Chacachacare, Monos and Gasparee for it without success. On Patos it is found only on exposed places usually near the sea. One such spot is on the slope immediately above the westerly bay: at the present time this area is devoid of practically all bush, and from the distance appears as a pure growth of grass. This barren part of the island may be the result of past attempts at clearing with a view to cultivation, or of bush fires. On close inspection it is found to be very rocky, and on the highest points near the cliff the Turk's Cap cactus is very abundant. In some cases this plant grows on the bare rock, in others amongst grass, but scarcely ever amongst high bush.

This cactus is more or less globular, about one foot or so in height, and has about fourteen strongly armed ridges. The areoles bear about nine very strong spines which are from a half to one inch in length. At the apex is produced the "Turk's Cap," the woolly and bristly structure termed the cephalium. It is usually unbranched, but we came across one small colony in the south-eastern part of the island where

PLATE III.

PLATE IV.

the plants had branched at the top, and in one instance as many as fifteen secondary branches were formed.

It is very evident that this plant requires plenty of exposure and prefers the vicinity of the sea, as few plants were found scattered amongst the undergrowth, whilst in certain exposed parts, notably the south-western extremity of the island, they grew in great abundance. Dr. Britton states that Patos is the most eastern known station for this plant and that it ranges westward along the Venezuelan coast into Colombia; it was first collected in La Guayra.

The flowers are small, deep pink, expanding from amongst the wool of the cephalium between one and two p.m., closing before next morning. The fruits are reddish with a blunt apex and pointed at the base. They push through the cephalium and drop during the course of about two days. The tiny black seeds are embedded in white pulp.

I collected two other representatives of the *Cactaceae*, one a long and at first perfectly erect and rigid triangular plant with areoles of whitish, brown-tipped spines. Usually nine spines are produced at each areole, the longest of which are as much as two inches long and the others shorter and of varying length. This appears to me to be *Acanthocereus pentagonus* (L.) Britt. & Rose.

Another triangular species was apparently *Hylocereus Lemairei*, a night-blooming Cereus; only small specimens were seen and those not in flower. I had, however, collected this plant on Patos in 1917. This species was growing close to the water's edge; instead of being concave between the angles it was swollen and almost rounded. The same characteristic was noticed in what was apparently the same species collected on the rocks of Chacachacare in 1922. The plant is spiny, two or three short, brown spines being produced at each areole.

Most of the cacti on Patos appear to seed abundantly but the distribution of many of the species is largely increased by the breaking down of the branches, which when resting on the ground form adventitious roots and numerous erect branches which eventually develop into plants. The Turk's Cap cactus would appear to be almost entirely propagated by seeds.

Patos abounds in goats, the original stock having been placed on the island many years ago. They now run wild and from a botanical point of view do much damage to the undergrowth.

On pursuing our way beyond the flagpole we had to push through thick vegetation, and it was only possible to get through by following the goat tracks, not only on account of the quantity of cacti but largely because of the terrestrial Bromeliads and an *Agave*, pure associations of which were frequently met sometimes extending to an area of several acres. The worst offender in this respect was *Karatas humilis* E. Morren, a Bromeliad with orange-coloured leaves and dark brown spines about one-tenth of an inch long and recurved in different directions. This is a very conspicuous plant from the sea, and forms quite a pretty feature of the landscape. I only saw one specimen beginning to produce an inflorescence, and in this the crown of leaves surrounding it was a beautiful reddish colour. A large number of these in flower at the same time must make a gorgeous sight. This Bromeliad may be easily uprooted, but owing to the density of its growth and the sharpness of the spines, it was necessary to make a detour in the path when one came to a mass of this plant. Even the goats avoid it and in no case did we see any damage caused to it by these animals.

The same remarks are true of another terrestrial Bromeliad (*Gravisia aquilega* Mez). This has stout, broad leaves with short, recurved brown spines and erect flower-spikes about two feet in length. The plant is conspicuous on account of its large, showy, deep pink bracts which are as much as eight inches long and two inches broad. At the time of our visit this Bromeliad was flowering profusely and added a considerable touch of colour to the undergrowth.

The only *Agave* noticed was *A. evadens* Trelease, and this was very common all over the island, growing even quite close to the sea. On the several ridges to the east of the island we found it very plentiful, especially in the more rocky situations. It was not so difficult to pass through as the Bromeliads, the cutlass having greater effect upon it, but the strong terminal spines were not pleasant, and in many cases we had to retrace our steps and find other tracks. This *Agave* flowers abundantly and is quite pretty when producing its erect "pole", on which are dispersed the bright yellow flowers. Iguanas are very plentiful on Patos, and on one occasion we saw one at rest on the "pole" of an *Agave*, and we were fortunate in getting it to remain still long enough to take a photograph, although a somewhat distant one. Immediately I had made one exposure it reversed its position to tail upwards and I was able to get another. These Iguanas are curious reptiles; the first intimation of their presence is usually a sudden crash, due to their clumsy manner of descending from the trees when alarmed.

With the exception of the *Agave* and the Bromeliads all the low undergrowth in this part of the island has been eaten by goats, and at this time of the year they must find great difficulty in getting food. We came upon a herd of about one hundred fine animals in good condition which made off with a great stampede down the hillside as soon as they sighted us.

Tecoma stans Juss. is a very common shrub on Patos, but it was practically leafless at this time of the year and only a few of its bright yellow flowers were seen. When conditions are more suitable for its blooming, it must be a pretty feature of the vegetation.

Of evergreen trees few were seen: amongst these were Lignum Vitae (*Guaiacum officinale* L.), the foliage of which was a brilliant green even at this time of the year. This tree was interesting as a source of supply of large, bright green snakes (*Oxybelis fulgidus*) for my colleague Mr. Urich, and he was able to capture several. Another interesting evergreen plant was one which somewhat reminded one from a distance of the evergreen oak. [Herb. No. 10,719, not identified.]

Pithecolobium Unguis-cati Benth., the bread-and-cheese plant, was noticed to be flowering, and the Poui (*Tecoma serratifolia* Don.) was also fairly common but not in flower at this time.

Few epiphytic or parasitic plants were seen, only one epiphytic Bromeliad being noticed in any quantity. Of orchids I found none, although in 1917 I collected a fine specimen of a terrestrial orchid, probably *Cyrtopodium Andersonii* R. Br., possessing erect pseudo-bulbs twenty-four inches in length on which the old leaf-bases are developed into sharp spines.

To obtain a more extended idea of the flora of Patos it would be necessary to return in the wet season. It would also be interesting to see to what extent the undergrowth recovers during the moist weather from the destruction by goats.

A fair quantity of other herbarium material was collected. This is entered under Nos. 10,719 to 10,731 and has been identified at Kew as follows.

MALVACEAE.

Bastardia viscosa *H.B.K.* A low shrub (10720).

STERCULIACEAE.

Melochia tomentosa *L.* Shrub 2 ft. high, foliage strongly scented (10723).

ZYGOPHYLLACEAE.

Guaiacum officinale *L.* (10711).

LEGUMINOSAE.

Pithecolobium Unguis-cati *Benth.* (10714).

COMBRETACEAE.

Laguncularia racemosa *Gaertn.* (10715).

CACTACEAE.

Opuntia Boldinghii *Britt. & Rose* (10738).
O. Wentiana *Britt. & Rose* ? (10732).
Cephalocereus Moritzianus *Britt. & Rose* (10737).
C. Smithianus *Britt. & Rose* (10735).
Lemaireocereus griseus *Britt. & Rose* (10740).
L. sp. (10736).
Acanthocereus pentagonus *Britt. & Rose* (10734).
Hylocereus Lemairei *Britt. & Rose* (10733).
Cactus caesius *Britt. & Rose* (10739).

COMPOSITAE.

Trixis frutescens *P. Browne.* Shrub 3-4 ft. (10730).

SAPOTACEAE.

Sapotacea. Small evergreen tree, without flowers or fruit (10727).

EBENACEAE.

Maba inconstans *Griseb.* Shrub 8-10 ft. (10729).

SOLANACEAE.

Lycium americanum *Jacq.* (10722).

SCROPHULARIACEAE.

Capraria biflora *L.* Shrub 2-3 ft. (10724).

BIGNONIACEAE.

Tecoma stans *Juss.* (10712).

EUPHORBIACEAE.

Jatropha urens *L.* Shrub 3 ft. (10726).
Croton sp. Shrub 2-3 ft. (10731).
Ditaxis Fendleri *Pax & K. Hoffm.* Low straggling shrub (10725).

BROMELIACEAE.

Gravisia aquilega *Mez* (10716).

GRAMINEAE.

Panicum sp. (10717).
Cynodon Dactylon Pers. (10718).
Eragrostis sp. (10721).

EXPLANATION OF PLATES.

I. Types of vegetation on Patos. Grass among which the Turk's Cap Cactus grows, and low bush.

II. **Cephalocereus Moritzianus** *Britt. & Rose*, on Patos.

III. **Opuntia Boldinghii** *Britt. & Rose*, on Patos.

IV. The Turk's Cap Cactus, **Cactus caesius** *Britt. & Rose*, on Patos.

XXXII.—ADDITIONS TO THE INDEX KEWENSIS: III.*

The botanical results of the French scientific Mission to Mexico and Central America, 1865–66, were published in two volumes, the *Cryptogamae*, by Nylander, Bescherelle and Fournier, appearing in 1872, and the *Gramineae*, by Fournier, in 1886.* The latter volume, however, was actually in print as early as June 1880, and clean sheets were sent by Fournier to several botanists, including Bentham†, who received a set in March 1881 and presented it to the Kew Library.

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* Continued from *Kew Bull.*, 1924, 171.

The long delay in publication was attended by unfortunate results. The new generic names proposed by Fournier were published by Bentham‡, either as synonyms (*Achaeta*, *Apogonia*, *Chaboissaea*, *Cinnastrum*, *Crypsinna*, *Dimorphostachys*, *Helleria*, *Peyritschia*) or as accepted names (*Bauchea*, *Gouinia*. *Trichloris*). Nearly all the new specific names were published by Hemsley§, some as accepted names, and other as synonyms, but in most cases *without any description.* Hemsley cited the pages of Fournier throughout, and Fournier's species were originally cited in the manuscript of the Index Kewensis from Fournier's Enumeration. During the preparation of the manuscript for press, however, it was discovered that the Enumeration was not published until 1886, and the references to it were accordingly deleted|| except in a few genera, e.g. *Andropogon*, *Aristida* and *Cenchrus*, where they were inadvertently retained in addition to the references to the Biologia. A few of Fournier's names which were missed by Hemsley (*Brizopyrum uninervium*, *Chondrosium Drummondii*, *Cinnastrum miliaceum*, *C. poaeforme*, *Eatonia densiflora*) and some others which he cited in synonymy (*Apogonia glabrata*, *A. ramosa*) or mentioned incidentally (*Arundinella robusta*, *Triathera gracilis*, *Uniola effusa*, *U. Muelleri*, *Vilfa confusa*, *V. densiflora*) were omitted from the Index Kewensis, but were inserted in Supplement I. in the following manner: " *Vilfa confusa* Fourn. Gram. Mex. 1881 (1886) 101." This is misleading, as it implies that the work is dated 1881, whereas the only date on the title-page is 1886.

Except in a few cases where Hemsley repeated short diagnoses given by Fournier, the new species taken up by him from Fournier appeared as *nomina nuda* in the Biologia, and the references given in the Index Kewensis are consequently incomplete.

Fournier's new genera and species are now being inserted in Index Kewensis, Suppl. VI., with references to the *descriptions* in Fournier's Enumeration. Pending the appearance of the Supplement it seems desirable to give a condensed list of the names with the corresponding page numbers of Fournier's work. The new genera described by Fournier are indicated by the word " (descr.)".

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* Cat. Libr. Brit. Mus. (Nat. Hist.) ii. 604.

† Hackel in Bot. Centralbl. 1886, xxviii. 232; Bentham Correspondence, iv. 1459.

‡ Journ. Linn. Soc. Bot. xix. 14-134 (1881); Benth. et Hook. f. Gen. Pl. iii. 1074-1215 (1883).

§ Biol. Centr.-Amer. Bot. iii. 475–588 (1885).

|| The period covered by the Index Kewensis was "from the time of Linnæus to the year 1885 inclusive".

FOURNIER, MEX. PL. ENUM., GRAM. (1886).

- Achaeta (descr.) 109
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XXXIII.—FRESH-WATER ALGAE OF THE WEST FALKLANDS.

COLLECTED BY MRS. ELINOR F. VALLENTIN.

Shortly after my return from the Falklands in 1911 I gradually distributed my collections to the various specialists who very kindly undertook to report on them.

The fresh-water algae were accepted by Mr. William West, who unfortunately died in May, 1914. On 4th August of that year I received the following note from Prof. G. S. West . . .

"In going through my late father's papers, I have come across several letters from you relating to some algae from the Falkland Islands. All the algae collections are now in my hands, and should you desire it, I will myself report on them, although it will be at least two years before I can promise to work through them . . .". I wrote at once and gratefully accepted Prof. G. S. West's kind offer, and there the matter rested. Then followed the news of his lamented death some years later.

Most fortunately, some time afterwards, DR. NELLIE CARTER of Birmingham University, most kindly came to my assistance, and on sending her some fresh material, that originally sent to Mr. William West having been lost, she drew up the following lists, writing to me on the 26th January, 1921, as follows :—

"I am sending you a list of the algae which I hope will be of some use to you. It was compiled chiefly from notes left by W. West, and all the additions and remarks added by myself I have initialled. I have by no means exhausted all the material in the tubes you sent me, but in the case of microscopic algae one finds something not previously noticed in almost every dip from the tube, and it is possible to go on almost *ad infinitum*." "As I have so much other work on hand, and it would probably be some time before I could prepare a compilation suitable for separate publication, I thought it advisable to send you the list just as it is at once . . ."

FLAGELLATA.

Dinobryon Sertularia, Ehrenberg.
Lake near Settlement, Teal River.

MYXOPHYCEAE.

Microcystis sp.
Port North Lake, and lake near Settlement, Teal River.
Glœothice sp.
Ponds on track to Teal River.
Coelosphaerium Kützingianum Nägeli.
Lake near Settlement, Teal River (N. C.).
Distrib.—Europe, Africa, America.
Merismopedium glaucum (Ehrenberg) Nägeli.
Lake near settlement, Teal River (N. C.).
Merismopedium sp.
Lagoon, Byron Sound.
Oscillatoria sp.
Lagoon, Byron Sound, and Port North Lake.
Oscillatoria limosa (Roth) Agardh.
Shallow Bay.
Phormidium sp.
Locality not stated.
Lyngbya sp.
Horse Paddock, Shallow Bay.

Lyngbya Lagerheimii (Moeb.) Gomont.
Pond near Teal River (N. C.).
Distrib.—Europe, America.

Nostoc sp.
Moor Pools and Horse Paddock, Shallow Bay.

Nodularia spumigena Mertens.
Shallow Bay (Volvox tube) (N. C.).
Distrib.—Europe.

Rivularia sp.
Moor Pools, West Falklands.

BACILLARIACEAE.

Fragillaria sp.
Common.

Synedra sp.
Lake near Settlement, Teal River and Port North Lake.

Navicula (various species).
Common.

Stauroneis Phoenicenteren Ehrenberg.
Lagoon, Byron Sound.

Gomphonema sp.
Common.

Nitzschia sp.
Shallow Bay (Volvox tube).

Swirella ovalis Brébisson.
Lagoon, Byron Sound.

Swirella cardinalis Kitton.
Pond, Saunders Island (N. C.).

Swirella sp.
Shallow Bay.

CHLOROPHYCEAE.

Volvox aureus Ehrenberg.
Shallow Bay.
Distrib.—Europe, Asia, America.

Tetraspora sp.
Moor Pools, West Falklands.

Gloeocystis gigas (Kützing) Lagerheim.
Lake near Settlement, Teal River (N. C.).
Distrib.—Europe, America.

Eremosphaera viridis De Bary.
Fresh-water pool in camp.
Distrib.—Europe, America.

Kirchneriella obesa (West) Schmidle.
Lagoon, Byron Sound.
Distrib.—Europe.

Scenedesmus quadricauda (Turp.) Bréb., var. *maximum* West.
Rush Pond, east corner of Byron Sound (N. C.).
Distrib. (of type).—Europe, Asia, America, New Zealand.

Scenedesmus sp.
Fresh-water pool in "Camp".

Pediastrum Boryanum (Turp.) Meneghini.
Lagoon, Byron Sound, and pond on Saunders Island.
Distrib.—Europe, Asia, America.

Pediastrum angulosum (Ehrenberg) Meneghini, var. *rugosum* Racib.
Pond on Saunders Island.
Distrib.—Europe.

Vaucheria sp., sterile.
Rush Pond, East corner of Byron Sound (N. C.).

Prasiola sp.
Rush Pond and Port North Lake.

Geminella minor Heering.
Rush Pond, Byron Sound.

Ulothrix subtilis Kützing.
Lake near Settlement, Teal River and Rush Pond, Byron Sound (N. C.).

Ulothrix sp.
Common.

Binuclearia tatrana Wittrock.
Reed Pond, Byron Sound. (The filaments were only about half their usual size. Breadth of cells 3.5–4 μ; length 4.5–5 μ N. C.).
Distrib.—Europe.

Chaetophora pisiformis (Roth) Agardh.
Common.
Distrib.—Europe, America.

Microthamnion strictissimum Rabenh.
Rush Pond, Byron Sound.
Distrib.—Europe.

Mougeotia, several species sterile.
Common.

Zygnema stellinum (Vaucher) Ag. var. *subtile* (Kützing) Kirchen.
Reed Pond, Byron Sound (N. C.).
Distrib.—Europe, America.

Zygnema sp., sterile.
Common.

Spirogyra tenuissima (Hass.) Kützing.
Reed Pond, Byron Sound (N. C.).
Distrib.—Europe, America, New Zealand.

Spirogyra, several species sterile.
Common.

Closterium Venus Kützing.
Rush Pond, Byron Sound (N. C.).
Distrib.—Europe, Asia, America, New Zealand.

Closterium sp.
Moor Pools, near Horse Paddock.

Cosmarium sp.

Port North Lake; another species from the pond on Saunders Island.

Bulbochaete sp., sterile.

Lake near Settlement, Teal River (very abundant).

Oedogonium, several species sterile.

Common.

A very interesting form of this genus was observed in which the filaments were coiled in a regular spiral. The specimens occurred in a plankton collection from a pond near the Teal River, the chief constituent being a sterile species of *Bulbochaete*. Amongst this were the minute spirals of *Lyngbya Lagerheimii*, and coiled filaments of a very narrow species of *Oedogonium* (length of spirals about 360 μ; diameter of spiral 25–35 μ; distance between turns 60 μ; diameter of cells 4–5 μ; length about 30 μ). Spirally twisted filaments of *Mougeotia* and *Ulothrix* are already known to occur in plankton, and the same phenomenon is also known in certain *Myxophyceae*, but, as far as I know, coiling has not been previously observed in *Oedogonium* (N. C.).

Botryococcus Braunii Kützing.

Byron Sound Lagoon.

Tribonema sp.

Rush Pond, Byron Sound.

This species may be new, it corresponds with *T. utriculosum* Kützing, in its dimensions, but has very much thicker walls (N. C.).

XXXIV.—ON THE FLORA OF THE GALLIPOLI PENINSULA.

W. B. Turrill.

The Peninsula of Gallipoli, the Thracian Chersonesus, now again under Turkish sovereignty, has considerable botanical interest, from its position near to Asia Minor. It forms one of the remaining portions of the Aegean land area across which was the connection between the floras of Asia Minor and the southern parts of the Balkan Peninsula. Till recently few persons visiting the Gallipoli Peninsula had interested themselves in its flora, and though the present paper is concerned only with the western portion it is not surprising that there are many records which add to our knowledge of the distribution of species. A brief account of the visits of botanists to or near the Dardanelles will serve to indicate how the Gallipoli Peninsula has been neglected.

Tournefort sailed through the Dardanelles in 1701, but apparently did not land to collect plants. In the English edition of his "Voyage into the Levant," London, 1718, Letter xi.

pp. 340 seq., he gives an account of the Straits and of the land on each side as seen from the boat.

Pehr Forsskål visited the Dardanelles in 1761. I have found no evidence that he collected on the European side. According to C. Christensen in Dansk Bot. Arkiv. iv. 3. 6 (1922) he sailed from Constantinople on Sept. 11 and stayed at Borghas (Burgaz), a little distance inland on the Asiatic side, from Sept. 15 to 17. It was probably at this time that he collected *Delphinium aconiti* described from his material by Linnaeus, Mant. 77 (1767).

Aucher-Eloy must have passed several times through the Dardanelles in his journeys to and from Constantinople. Thus in his "Voyages en Orient," edited by le Comte Jaubert and published in 1843 after his death, there are references in the first part, pp. 9–10, and in the second part, p. 371, to passages through the Straits. I feel certain from evidence on some sheets of plants collected by him and preserved at Kew that he, and apparently also his part-time companion Coquebert de Montbret, collected in the area, but whether on the European or Asiatic side or on both sides I do not know.

In 1839 Grisebach travelled extensively in the Balkan Peninsula and N.W. Asia Minor and his itinerary is fully described in his "Reise durch Rumelien und nach Brussa" (Gottingen, 1841), while the plants he collected are listed, often with excellent descriptions, in "Spicilegium Florae Rumelicae et Bithynicae" (Brunsvigae, vol. i. 1843; vol. ii. 1844). On 18th May Grisebach left Constantinople and travelled along the northern coast of the Sea of Marmara, via Silivria to Rodosto. From thence skirting the Tekir Dagh he crossed inland to Ainijik and to Malgara and Kesan, arriving on the coast again at Enos on May 25. Although he thus missed the peninsula of Gallipoli entirely, his accounts of the vegetation along the route he took are very instructive and are to be found in the fifth chapter of the first volume of his Reise (pp. 102–143).

In the Kew Herbarium there are some specimens with labels indicating that they were collected by F. Calvert, in 1867, near the Dardanelles, but exact localities are not given, and I do not know whether or not any were collected in Gallipoli.

In 1883 P. Sintenis made a notable collection in the Troas on the Asia Minor side of the Dardanelles. An excellent set of specimens of this collection is in the Kew Herbarium. The plants were determined by Ascherson, but so far as I have ascertained no general account of them was published, though some are quoted in the last (fifth) volume of Boissier's Flora Orientalis, 1884 (Monocotyledons, Gymnosperms and Vascular Cryptogams) and in the Supplement (1888) by R. Buser. Apparently Sintenis crossed over one or more times to the European side of the Straits and collected a few specimens around Maitos (Maidos), at least.

Dr. N. Stoianoff, now Professor of Botany in the Faculty of Agriculture, Sofia University, spent 5 months (Dec. 1912 to April 1913) in and around the Tekir Dagh, just to the east of

Gallipoli Peninsula. In his account in the Yearbook of the University of Sofia, viii-ix., 1914, he records 286 plants. Though his observations deal essentially with the spring flora only, there is evidently a close connection between the flora of this district and that of the Gallipoli Peninsula, as would naturally be expected.

A few plants from the Gallipoli Peninsula are mentioned by E. Jeanpert in his paper "Enumération de Plantes d'Orient" in Bull. Mus. Nat. d'Hist. Nat. 1920, 666.

The names of about 20 plants collected in Gallipoli Peninsula by Lt.-Col. F. R. Durham are contained in my paper "A Contribution to the Flora of the Nearer East" published in the *Kew Bulletin*, 1922, p. 291, while in the volume for 1921, p. 128, I tentatively recorded *Gonocytisus angulatus* from Cape Helles. Further material now received confirms this identification.

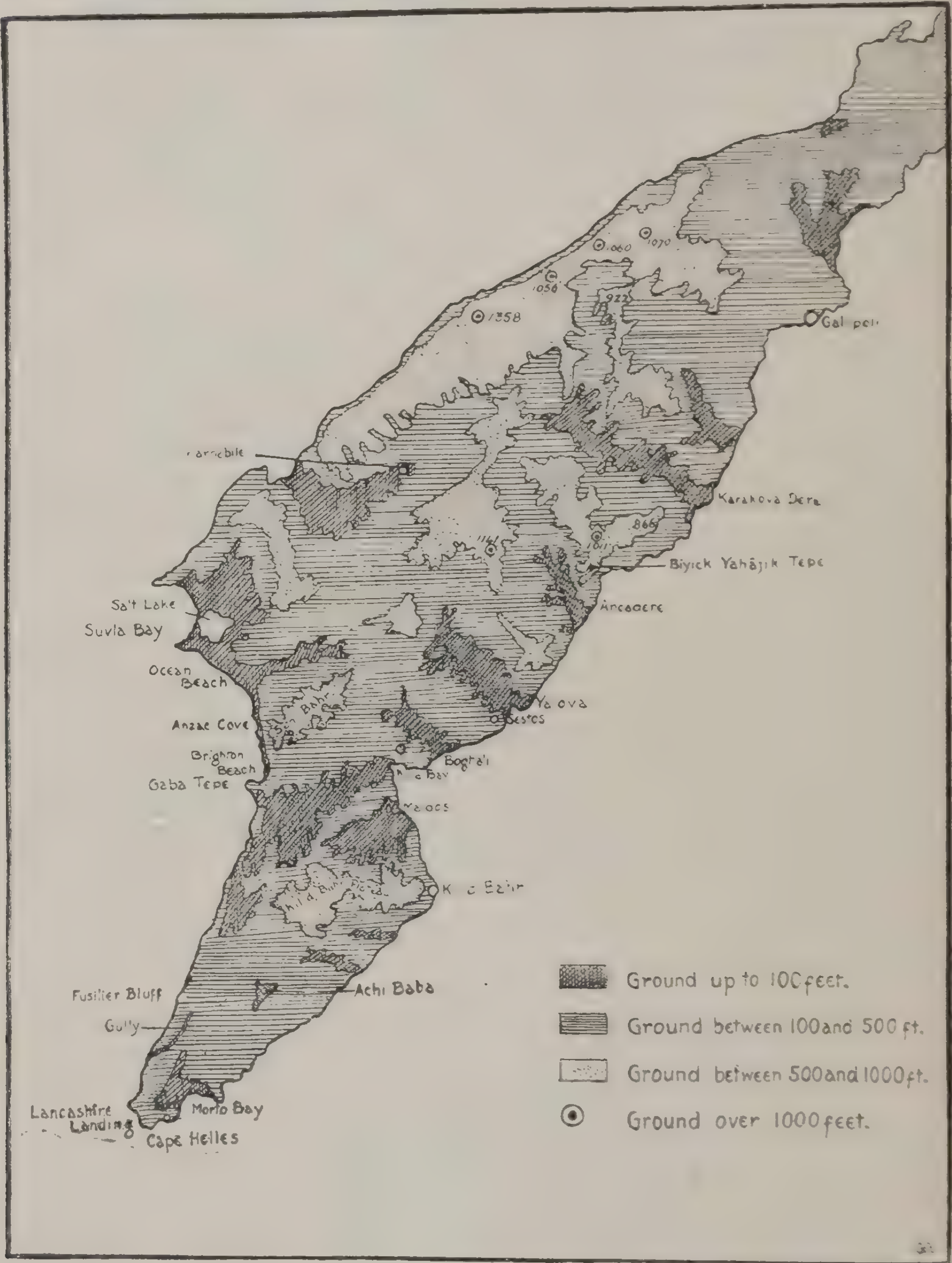
Many plant collections have been made in Eastern Thrace, chiefly around Constantinople and Adrianople, and there are also a number of scattered accounts of the flora of Western Thrace, that is, west of the Lower Maritza. The following papers should not be missed by students of the Balkan Peninsula flora: I. K. Urumoff, Neue und seltene Pflanzen Bulgariens, in Mag. Bot. Lap. 1920, 33; B. Davidoff, Edine Cvatobere be Zapadna Trakia (A botanical collection made in Western Thrace) in Trudove na Bulg. Prirod. Druz. viii. 43 (1915) (Works of the Bulg. Soc. Nat. Sci.); F. Markgraf, Botanische Kriegsbeobachtungen in Thrazien in Verhandl. Bot. Vereins Prov. Brandenburg, 1920, 8; B. Stefanoff, Beleshki varku rastitelnostata na Zapadna Trakia (Notes on the Flora of Western Thrace), in Godishnik na Sof. Univ. xv.-xvi. 1918–1920, Sofia, 1921 (Yearbook of the Univ. of Sofia); and I. K. Urumoff, Prinosa za Florata na Belomorska Trakia (A contribution to the knowledge of the flora of Western Thrace), in Spisanie na Balg. Akad. na Naukita xxviii., 1923 (Publications of the Bulg. Acad. of Science).

The collections on which the present paper is based have been made as follows:

Capt. C. M. Ingoldby	610 specimens.
Mr. R. Kett	154 ,,
Lt.-Col. F. R. Durham, C.B.E., M.C.	120 ,,
Plants in cultivation at Kew, or received as living specimens at Kew, grown from seeds, bulbs, etc., from Gallipoli (about)	20 ,,
Total ..	904 ,,

A number of plants from Gallipoli Peninsula are now in cultivation at Kew, but most of them have not yet flowered and are therefore not included here. Our best thanks are due to the collectors for the great trouble and interest they have taken in making the collections and for their generosity in presenting them to Kew.

I also wish to thank Mr. Pugsley for help with the *Fumaria*, Mr. C. E. Salmon for help with the *Plumbaginaceae*, Mr. Dykes for naming *Iris mellita* and the tulips, Mr. Wilmott for identifying *Anthyllis Hermanniae*, and Prof. Chodat for the loan of specimens from Boissier's Herbarium and information regarding Boissier's journey in 1842.



OBSERVATIONS AND NOTES BY CAPT. INGOLDBY.

From January 19th, 1923, to August 25th, 1923, I was stationed on the Gallipoli Peninsula, and quartered during the greater part of that time at Kilia. The force was scattered in small detachments over the Peninsula, affording opportunity of transit to places otherwise difficult of access. Except for the few military roads communications on the Peninsula are of an elementary nature and local transport consists of little but donkeys. I was unable to reach as far to the north-east as the town of Gallipoli, or to the great "backbone" ridge along the north-west coast.

General Account.—The Peninsula of Gallipoli consists, as is well known, of a main part, about 28 miles long. This is subconical with the apex at the isthmus, about 3 miles in width at its narrowest part, and the base, stretching from Suvla to Kilia Bay, about 11½ miles across. From the lower third of this base a smaller triangular spit of land projects, widest and highest at its base, towards the main bulk of the Peninsula, and narrowing to its apex at Helles with points westwards; its long axis is parallel to that of the main part.

A strip of flat, low land, somewhere above 100 ft., separates these two portions, running from just S. of Gaba Tepe to Kilia Bay.

Similar low ground is found at the isthmus. Undoubtedly from time to time these two areas, as also the flats around and to the N.E. of Suvla, have been submerged by the sea, the Peninsula having thus been converted into two islands.

The great bulk of the main part of the Peninsula is hilly, averaging perhaps 300–600 ft., rising occasionally to 1000 and in one place to over 1300 ft. The main ridge runs along and close up to the Aegean Coast, which in consequence is precipitous in practically its whole length.

A series of parallel valleys, narrow, with more or less steep, thickly scrubbed sides, running at right angles to the long axis, and ending in the Dardanelles, break up the hill mass on the eastern side. These valleys are for the most part well watered and fertile. Their position is indicated on the accompanying map by the 100 ft. contour lines. Corresponding areas of low ground on the Aegean side of the Peninsula are drier and less fertile; as is the strip from Suvla to Kilia. These no doubt correspond to more or less naked marine sediments (vid. inf.); the surface soil of the valleys of the Dardanelles side is alluvial.

The area between 100 and 500 ft., considerably the greater portion of the Peninsula, consists of open rolling ground, stony and poor, and covered with grass and low scrub.

Above 500 ft. the hill slopes are commonly thickly scrubbed. At places where the hill slope is steep, as on the Aegean side of Sari Bahr and a curious small area at the head of the Maidos Valley, the ground is cut up into nullahs of light crumbly soil, showing rapid erosion. *Capparis sicula* is about the only plant which flourishes on this last-mentioned little area. Most of the coast is more or less steep. The few beaches on the Aegean coast are too well known to need mention.

Cultivation is confined to the Dardanelles valleys and certain areas of the low ground to the west.

Localities.—The locality of a specimen in the collection is indicated by (1) the name of the nearest village or camp (e.g. Kilia. Maidos), (2) of a hill top (e.g. Biyich Tepe. 1141). (3) of a valley (Karakova Dere), or (4) of an ill-defined area of some extent without very definite place-names other than those of military origin ; examples are Helles and Anzac. Of these last. the former includes the area from the beach of World Bay to the cliff tops north of the Gully, up to Fusilier Bluff ; the latter, Anzac, includes Anzac Cove and Brighton Beach up the slopes of Sari Bahr. Suvla indicates the flat ground in the neighbourhood of the Salt Lake.

Vegetation.—Of forest proper there is none. A small wood of tall pines (*P. halepensis*), near Kilid Bahr. cypress groves round the Turkish cemeteries, and a few olive groves. include almost all the trees of any size on the Peninsula. except for various fruit trees in the neighbourhood of the villages and a few scattered small oaks (usually *Quercus aegilops*), and an occasional poplar in the valleys.

Types of Vegetation and their Distribution.—*Type I.*—Mainly above 500 ft., but extending down the sides of the steeper valleys on the Dardanelles side and on the Sari Bahr is brushwood. often dense and grown up to 10 or 15 ft. in many places. This is composed in various proportions of oak, *Arbutus*, pine. *Cotoneaster*, juniper, myrtle, and a large number of others.

Type II.—Grass and low scrub (ankle to knee deep) covers the open hillsides (100 to 500 ft.) of poor. stony soil which make up the greater part of the Peninsula. especially in its western half. The shrubs are of great variety, including a dwarf form of holly oak (*Q. coccifera*), *Cistus*, *Coridothymus capitatus*. *Astragalus trojanus*, juniper, *Erica*, *Thymelaea*. etc. Occasional bushes of *Paliurus* and *Quercus aegilops* rise to several feet : there are patches of holly oak growing up to 6 or 7 feet.

Type III.—Fairly rich meadow land in the eastern valleys. with a thick tangle of growth along the contained stream : this latter vegetation consists of small trees and bushes of *Platanus* and *Salix* supporting a dense mass of climbers and creepers—*Rubus*. *Periploca*, *Clematis*, *Althaea*. *Convolvulus*. etc. Towards the mouth of some of the streams there are patches of marsh.

Type IV.—Salt Marsh. Mainly around the Salt Lake and the sea fringe of Kara Kova Dere. *Limonium*. *Goniolimon*. a few species of *Centaurium*. *Frankenia*. *Polygonum maritimum* and characteristic sedges and grasses.

Type V.—Sand Dunes. as at Suvla. between the salt marsh and the pebbly beach. Characteristic plants are sedges. various Eryngiums, *Pancratium* and *Marsdenia erecta*.

Encroaching on this and fringing the beaches everywhere is a nondescript tangle of grasses and composites with bushes of *Astragalus*, *Paliurus*, *Capparis*, holly oak, etc.

Type VI.—Beach. Usually pebbly. *Eryngium*, *Matthiola*, *Salicornia*, *Cakile*, etc.

Climate.—The winter from late October to early March is wet and cold, though there is rarely more than a degree or so of frost. Frequent squally days of sleet, rain or snow alternate with short periods of bright sunshine. Spring is warm with a high sunshine rate. It may be said to last till the end of April. Little rain falls from April to October. The summer is moderately hot, dry, with an almost constant N.E. wind.

Flower Sequence.—The sodden hillsides of winter offer little promise of the superb displays of flowers which succeed one another from March far into the summer. A few *Colchicum* plants in late February, increasing in number, with species of *Ornithogalum*, *Myosotis*, and a few *Ranunculaceae*, etc. in early March herald the spring outburst, when great areas are covered thick with many coloured anemones (*A. coronaria* and, a little later, *A. pavonina*), *Adonis*, *Gagea*, while close on a score of orchids, *Romulea*, various *Borraginaceae*, *Leguminosae*, *Styrax*, honeysuckle, crocuses, irises, and superb Euphorbias occur in profusion in suitable localities. The spring flowers last but a short time, being replaced towards the end of April, as the land dries, by clusters of flax, innumerable bushes of rock roses (*Cistus salviifolius* and *C. villosus*) etc. On the hillsides are poppies in great profusion, Chrysanthemums, many fine legumes (*Astragalus*, *Vicia*, etc.), *Legousia*, *Gladiolus*, corn cockle, fine Glauciums, *Anchusa italica*, and sundry Echiums, hollyhock, *Dianthus*, to name a few of the more striking.

By July the hillsides are burnt and brown again and even in the valleys most of the water is diverted to crops. Even so the countryside is bright everywhere with a rich flora of composites, mostly xerophytic, from the clumps of a superb blue chicory on the flats to the hillsides covered with a great variety of *Echinops*, *Centaurea*, *Carduus*, etc. Great mulleins, Delphiniums, and *Nigella* occur all over the flat ground and lower hillsides, with bushes of Spanish broom and the sweet-scented *Gonocytisus* and huge clumps of *Vitex agnus-castus*. Sea lavender, stocks, and *Pancratium* occur abundantly at sea level in suitable places.

I have to express my indebtedness to Major W. M. T. Martin, R.F.A., who gave me much assistance in collecting in the Angadere area and in the vicinity of Gaba Tepe.

GEOLOGY.

An account of the geology of the Dardanelles district is given by T. English in the Quart. Journ. Geol. Soc. 1904, and some particulars are mentioned by J. Cvijić in Peterm. Geogr. Mitt. Erg. xxxiv. 383 (1908). A more recent paper by W. Penck on the geological structure and history of the Gallipoli Peninsula will be found in Zeit. Ges. f. Erdk. 1917, 30.

It is generally agreed that the Aegean Sea is of recent formation, geologically speaking, and Suess even suggests that man may have witnessed its formation. There is not, however, uniformity of opinion concerning the origin of the Dardanelles. Petermann [Das Mittelmeergebiet 18, 21, 44 (1914), etc.] and Cvijić (l.c.) refer to it as an erosion valley, through which a river formerly flowed, but which, after the sinking of the Aegean continent, was overflowed by the sea. In the north of the Gallipoli Peninsula there are sandstones and marly slates of the Upper Cretaceous period: above these, but farther to the south, there follow 6000 m. of Tertiary sediments, which in the Straits are crowned by Sarmatic (marly, sandstone, conglomerate) and Pontic (limestone) deposits, together 150 m. in thickness. These Sarmatic-Pontic beds are nearly or quite horizontal, whilst the older rocks are folded, and on the north coast of the Peninsula form a hilly landscape up to 400 m. in altitude. The strike direction of the folding corresponds nearly to the long-direction of the Peninsula, and Lt.-Col. Durham has suggested to me the existence of a big fault running parallel with this. A young Pliocene (Levantine) elevation of the land gave origin to the erosion furrows and fluviatile rubble. A still younger disturbance (light folding and faulting) accompanied the invasion of the sea into its present basin and moulded the existing relief in its general features.

According to Penck the Straits lie almost in the axis of a great synclinal fold and in a rift valley (Grabenbruch), which is sunk in it, and follows a special zone of destruction of the horizontal layers. It seems most probable that both tectonic foldings, elevations and sinkings, and also river and marine erosion have helped in the formation of the Dardanelles as we find them to-day.

ECONOMICS.

The Gallipoli Peninsula, so far as it is utilized by the inhabitants, is entirely pastoral and agricultural. As in most parts of Turkey, methods are antiquated, results unsatisfactory and yields low. The south-west part of the Peninsula is in general much less inhabited than the north-east, the farms and villages being smaller and less frequent. Maize is one of the chief agricultural products, but tobacco and cotton are also grown. Many of the villages have vines around them, but the vineyards have deteriorated recently, partly owing to the compulsory emigration of the Greek inhabitants. Phylloxera has attacked the vines in many parts of Thrace. Mulberry trees for silkworm culture occur frequently, and some 10 to 15 years ago efforts were made to increase the industry. The results were not satisfactory, and even before the war it was reported that the inhabitants of the Gallipoli Peninsula had been uprooting their mulberry trees. Flocks of sheep and goats are pastured in some of the valleys and on many of the hills and help to prevent tree growth. Lack of water accounts for the uninhabited nature of the higher parts of the country.

FLORISTIC COMPOSITION AND GEOGRAPHICAL DISTRIBUTION.

The species recorded in this paper from Gallipoli Peninsula number 472, and there are 23 additional varieties named. The species number is made up as follows :

Dicotyledons	390
Monocotyledons	79
Coniferae	2
Filices	1
	472

While no pretence is made that the collections are exhaustive it is felt that together they are representative, and that sufficient species have been collected to make some generalisations possible. The 13 families represented by the largest number of species are, in descending order :

Leguminosae	..	with	68	species.
Compositae	..	,,	46	,,
Labiatae ..	..	,,	27	,,
Gramineae ..	..	,,	25	,,
Liliaceae ..	..	,,	20	,,
Cruciferae ..	..	,,	18	,,
Caryophyllaceae	..	,,	18	,,
Umbelliferae	..	,,	18	,,
Borraginaceae	..	,,	18	,,
Ranunculaceae	..	,,	17	,,
Orchidaceae	..	,,	17	,,
Scrophulariaceae	..	,,	12	,,
Rosaceae ..	..	,,	11	,,

The above 13 families account for 315 species, leaving 157 to be divided amongst the other 58 families, which have less than 10 species each, 25 having only 1 each. The predominance of *Leguminosae* is striking and is partly accounted for by the very diverse habits and life-forms found amongst the 68 species, small trees, bushes, dwarf shrubs, perennial and annual herbs all occurring. The leguminous annual herbs are particularly noteworthy, since their life-histories are so obviously in accord with the climatic conditions.

Two species are described as new, *Dianthus Ingoldbyi* and *Asyneuma parviflora*. Seven new varieties are named as follows : *Althaea ficifolia* Cav. var. *chersonesensis*, *Malope malacoides* L. var. *acuminata*, *Astragalus anatolicus* Boiss. var. *parviflorus*, *Trifolium stellatum* L. var. *adpressum*, *Cotoneaster pyracantha* Spach var. *aurantiaca*, *Cerinthe minor* L. var. *hispida*, *Orchis tridentata* Scop. var. *chersonesensis*. Three new combinations are made : *Delphinium subvelutinum* Heldr. ex. R. Buser var. *transiens* (Hal.), *Limonium vulgare* Mill. var. *macroclada* (Boiss.), *Carex flacca* Schreb. var. *cuspidata* (Aschers. et Graebn.).

The figures used to indicate distribution have the following significance given to them: The Roman figures: I. Cosmopolitan or practically so. Ia. Old World. II. North Temperate. III. East North Temperate. IV. General European. V. Mediterranean Regional. VI. Mediterranean (Basin). VII. Western Mediterranean (Basin). VIII. South European. IX. Italian. X. Eastern Mediterranean (Basin). XI. Oriental. XII. Central European. XIII. Dacian. XIV. Pannonian. XIVa. Pontic. XV. Alpine. XVI. West North African. XVII. Egyptian. XVIII. Caucasian. XIX. Balkan Peninsular. XX. Endemic (to the Balkan Peninsula). A full explanation and discussion of these figures it is hoped will appear in a later work. For the purposes of the present paper it may be accepted that the centre of distribution or main area of the species is indicated by the figure given in any instance. The Arabic figures indicate the regions within the Balkan Peninsula where the species occurs: 1. Crete. 2. Greece south of Thessaly. 2a. Cyclades. 3. Thessaly. 3a. Olympus massif. 3b. Pindus. 4. Epirus. 5. Albania. 6. North Macedonia. 6a. South Macedonia. 6b. Athos Peninsula. 7. Thrace. 7a. Imbros, Lemnos and Samothrace. 8. North Bulgaria. 8a. South Bulgaria (Eastern Rumelia). 8b. Rhodope massif. 9. Dobruja. 10. Serbia. 10a. Sandjak of Novipazar. 11. Montenegro. 12. Bosnia. 13. Herzegovina. 14. Dalmatia. 15. Croatia. 16. Istria.

The letters B.P. wherever used in this paper should be read Balkan Peninsula, a less ambiguous phrase than "the Balkans."

Ecologically and floristically the flora of the Gallipoli Peninsula is Mediterranean as contrasted with Central European. It would, indeed, be difficult to find a more typical Mediterranean flora, as the results, given below, of a careful analysis indicate. It is interesting to note that Capt. Ingoldby records two types of vegetation which are very characteristic of the Mediterranean flora proper. His "Type I." is certainly the macchie, and "Type II." pseudomacchie merging into phrygana in places. As in so many other parts of the Mediterranean Region, there is now no true forest. While for many parts of the Balkan Peninsula I have definite evidence of forest destruction directly or indirectly by man's activities, details of this are not available for the Gallipoli Peninsula, and it is only by analogy that I assume that the Peninsula was formerly more wooded than it is now.

In the following account of the geographical distribution of the constituents of the flora of the Gallipoli Peninsula as recorded in this paper, I have used a portion of a scheme which I prepared some years ago, and have applied, in work not yet published, to the flora of the whole Balkan Peninsula. For the purposes of this paper, where a species has a distribution extending into two or more geographical districts, as here delimited, but does not extend over a sufficient area to be included under a more general and extensive category, I quote and use in calculations the two or more designations for the respective districts. In fact, every species would appear to have a distribution different from and independent of every other species. An analogy may be found in the process of gaseous diffusion in a mixture of gases. It follows that statistics concerning the geographical distribution of species are difficult to manipulate with sufficient accuracy, even when the full details for individual species are available, which they rarely are. However, a number of generalisations which have been made concerning the plants dealt with in this paper, appear to be worthy of publication. I have included in the figures those varieties whose distribution is given in the Systematic List.

Twenty-four species are regarded as cosmopolitan (I.), meaning that they occur in both the Old World and the New, and both north and south of the Equator. Some of these are weeds of cultivated land or of waste places (camp followers) and owe their wide distribution to man's activities. A few are maritime or marsh plants. Similar remarks apply to the one species limited to but widely spread in the Old World (I.a.) and the 9 species limited to the North Temperate Zone (II.), and, in a lesser degree, to the 61 species spread through the East North Temperate Sub-Zone (III.). Amongst the last class there are a number which have a quite natural wide distribution and show a number of geographical "varieties" in different parts of their distributional area, although these are not sufficiently isolated or morphologically characterised, or have not yet been sufficiently collected and studied, for them to be considered as separate species. Twenty-five species occur widely in Europe (IV.), excluding only the Arctic parts, but most of these extend also into another of my divisions.

The majority of the species have a distribution which I name Mediterranean Regional (V.), that is, they extend throughout all or most of the Mediterranean Botanical Region, from the Atlantic Islands, Spain and N.W. Africa to Mesopotamia, Persia and even to Sind; or Mediterranean (VI.), that is, are widespread only through the countries bordering the Mediterranean Sea. It is interesting to note that the respective figures, 128 for V. and 110 for VI., are nearly equal. Only one species, *Trifolium isthmocarpum* Brot., is Western Mediterranean (VII.), and this has been recorded previously from as far east as Sicily, but not from Greece; it will possibly have to be moved eventually to VI. Five species are South European (VIII.) in their distribution. No species in the list are Italian (IX.), that is limited to Italy and the Balkan Peninsula. Sixty-one species are Eastern Mediterranean (X.) that is to say are found only in the countries touching the Mediterranean Basin from Italy eastwards. Thirty-eight are Oriental (XI.) in their distribution, having their centre to the east of the B.P. but extending westwards to it and eastwards beyond the Mediterranean Basin proper. Fifty species, in addition to those of wider distribution, occur in Central Europe (XII.), but not one of these is limited to this region and the B.P. This is a negative point which further emphasizes the Mediterranean character of the flora of the Gallipoli Peninsula and incidentally the validity of the Mediterranean Botanical Region. Ten species are designated Dacian (XIII.), but only one of these solely so. Three are termed Pannonian (XIV.) and 14 Pontic (XIVa.) but none of the former and only one of the latter are limited to these categories. Six occur in the Caucasus (XVIII.), but not only there outside the B.P. in addition to more widely spread species which also occur there. Fourteen have their centre of present distribution most definitely, and probably had their place of origin, in the B.P. (XIX.). Twelve are, so far as is yet known, endemic to the B.P., this figure not including the 2 or 3 species, which I have only seen from the Gallipoli Peninsula. *Dianthus Ingoldbyi* and *Astragalus Duchesnei* are only known from the Gallipoli Peninsula, while the area of distribution for *Asperula parviflora* is, somewhat doubtfully, extended into northern Asia Minor and *Delphinium aconiti* almost certainly occurs on both sides of the Dardanelles Straits. In addition a number of the varieties, described as new in this paper, are not yet known outside the Gallipoli Peninsula.

The predominating Mediterranean type of flora in the Gallipoli Peninsula is very evident from the above summary. Another calculation makes this fact even clearer. Since the Categories V., VI., VIII., X., and XI., and, for this paper, XIX. and XX., all indicate that a species placed in them is Mediterranean in the sense that its distribution is limited to or decidedly centred in the Mediterranean Botanical Region, it is interesting to note that the species placed in at least one of these, and adding the newly described endemics, number 370. That is only 80 species and well marked additional varieties cannot be termed characteristically Mediterranean in the known flora of the Gallipoli Peninsula, and the great majority of these are widespread species.

The distribution within the B.P. of each species recorded here has been carefully worked out, so far as reliable data are available. It is not proposed to deal in this paper with the problems raised, but the distribution of a number of species calls for special comment. *Alyssum [illegible]* C. A. Mey. has in the B.P. hitherto only been recorded from Greece. *Trifolium isthmocarpum* Brot. is new to the B.P. *Rubia Olivieri* Rich. in the B.P. has only been known from Crete and Greece. *Anacyclus clavatus* Pers. in the B.P. has not been found outside Greece and Dalmatia. *Centaurea spinosa* L. and *Echium elegans* Lehm. have not been recorded hitherto in the B.P. outside Crete, Greece and the Cyclades. *Centaurium subspicatum* (Vel.) Ronn. has only been recorded from Bulgaria. *Hyoscyamus reticulatus* was indicated by Linnaeus for Crete but has not been mentioned by recent authors from the B.P. *Micromeria graeca* Benth. has been known in the B.P. only from Crete, Greece and Corfu. *Polygonum tenuiflorum* Presl has been recorded for the B.P. only from the Dobruja. *Cephalanthera cucullata* Boiss. et Heldr. has only been known from Crete. *Tulipa Hageri* Heldr. has been recorded only from Greece and *T. praecox* in the B.P. only from Croatia, and doubtfully from Greece, but much taxonomic work remains to be done on the tulips before we can be sure of their distribution.

The following nine species, including three already recorded in the *Kew Bulletin* and in addition to the two new species described in this paper, are new to Europe: *Dianthus lydus* Boiss., *Astragalus anatolicus* Boiss. (represented by the var. *parviflorus* Turrill), *A. Durhamii* Turrill, *A. trojanus* Stev., *Gonocytisus angulatus* Spach., *Genista anatolica* Boiss. (since collected in the East Rhodopes), *Hedysarum varium* Willd., *Onobrychis cana* Hand.-Mazz. and *Convolvulus pilosellaefolius* Desr.

Sixty-four species and 3 varieties are recorded for the first time, so far as I know, from Thrace, in addition to the new ones here described.

(*To be continued.*)

XXXV.—MISCELLANEOUS NOTES.

DR. H. MARTIN LEAKE.—We learn that Dr. H. Martin Leake, Sc.D., F.L.S., has been appointed Principal of the Imperial College of Tropical Agriculture, Trinidad, and Imperial Commissioner of Agriculture for the West Indies, in succession to Sir Francis Watts, K.C.M.G., D.Sc., on his retirement this autumn. (K.B. 1904, p. 13).

LIEUT.-COLONEL A. T. GAGE, I.M.S., M.A., B.Sc., M.B., F.L.S., Director, Botanical Survey of India and Superintendent, Royal Botanic Garden, Calcutta, has been appointed Librarian and Assistant Secretary to the Linnean Society of London.

MR. C. E. J. BIGGS, B.Sc., has been appointed Assistant Agricultural Officer, Uganda.

RETIREMENT OF MR. J. H. MAIDEN.—We are informed by Mr. J. H. Maiden, I.S.O., F.R.S., F.L.S., that his resignation from the posts of Director, Botanic Gardens, Sydney, and Government Botanist, New South Wales, has been accepted and can only regret very much the termination of his long connection with the Sydney Botanic Gardens. Mr. Maiden received his first public appointment in New South Wales in 1881 and after holding various posts was appointed Director of the Botanic Gardens and Government Botanist in 1896. He has for many years been identified with Australian botany, on which he is an acknowledged authority. In 1915 he was awarded the Linnean Medal by the Linnean Society, and in 1916 he was elected a Fellow of the Royal Society.

We look forward to the completion of his valuable "Critical Revision of the genus Eucalyptus" during his years of retirement.

Harry James Veitch.—Sir Harry Veitch was born at Exeter in 1840, and died at East Burnham Park, Slough, on July 6th last. He was educated at Exeter and at Altona, near Hamburg, and later on went to Paris to work with the great firm of French seedsmen, Messrs. Vilmorin-Andrieux and Co. In 1858, he joined his father at Chelsea in conducting the nursery business which had been taken over from Messrs. Knight and Perry five years previously. From that time until 1913–14, when he retired and the firm of James Veitch and Sons came to an end, he was (except for a short interval during which his nephew, the late J. H. Veitch, became manager) actively engaged in the business which, under his and his father's control, acquired and retained to the end a position of undoubted pre-eminence. It is safe to say that in the annals of English horticulture no career has ever equalled that of Sir Harry Veitch in combined length, activity and importance. Even after his retirement, when private business matters no longer occupied him, his interest in horticulture and especially in the Royal Horticultural Society remained as keen as ever. As lately as 1918, at a very difficult time, he undertook the office of Treasurer to that Society.

For very many years, dating back indeed to the time of Sir William Hooker's directorship of Kew, pleasant and close relations existed between this establishment and the Messrs. Veitch. This was naturally the case considering that for many years the firm was the most active agent in Britain or in Europe engaged in introducing new plants from abroad. Many of the most interesting and beautiful plants now in Kew, both out-of-doors and under glass, we owe to the enterprise of this firm. Whilst in no sense a botanist himself, Sir Harry helped to further the interests of science by allowing his plant collectors to make herbarium material of vegetation in the regions they visited. Mr. E. H. Wilson's collections of dried plants, for example, made during his journeys in Central and Western China in the early years of this century, were of particular interest. Of these, two complete sets were presented to Kew.

After 1864, when Richard Oldham, the last Kew collector, died at Amoy, the influx of new plants to Kew became less systematic than it had been in earlier days. Still, the numerous Botanic Gardens and private correspondents abroad with whom this establishment had relationships were the means by which many new plants were introduced to cultivation. Thus Kew was often able to effect exchanges with the Veitch's on more or less level terms, although it must be said that Sir Harry's kindly feeling towards the place never made a *quid pro quo* really necessary.

It would be impossible to record here the whole of the important plants introduced to cultivation under his auspices. The expeditions of Mr. E. H. Wilson to China are comparatively recent history. Previous to them, journeys by John Gould Veitch in Japan, Charles Maries in China and Japan, Richard Pearce in Chile, David Bowman in Brazil, J. H. Chesterton, G. Wallis and

W. Davis in South America. P. C. M. Veitch and F. W. Burbidge in Borneo, and C. Curtis in Madagascar and the East Indian Islands were some, but not all, of the enterprises undertaken by the firm during the period when Sir Harry was at the helm.

Nor could any account, however brief, of his activities omit mention of the great work in hybridization carried on under his direction. Orchids (in the hybridization of which the firm were the pioneers), Nepenthes, Hippeastrums, East Indian Rhododendrons and Begonias are but the chief genera on which his talented helpers worked with such success. Two literary works were published whilst Sir Harry was head of the firm: "The Manual of Coniferae" (1881) of which a second edition was issued in 1900, and "The Manual of Orchidaceous Plants" (1887–94). Besides being of real scientific value, both of them are particularly interesting because of the information the firm was able to supply about the habits and history of so many of the plants dealt with—information obtained at first hand from their own collectors and in many instances not otherwise obtainable. W. J. B.

A Pinetum near Canterbury.—About seventeen years ago, Mr. Neville Cooper, son of the famous animal painter Sidney Cooper, R.A., commenced the formation of a collection of conifers at Little Hall, St. Stephens, about 1½ miles out of Canterbury. The situation, some 250 feet higher than Canterbury itself, with a deep loamy soil, has proved very suitable, and the trees have made excellent growth. Mr. Cooper's residence is now at Vernon Holme, Harbledown, also a short distance out of Canterbury. Here also he has planted his favourite trees, and, although few in number as compared with the collection at Little Hall, they are equally robust in health. In the two places together a very interesting and comprehensive selection of *Coniferae* has been assembled.

The firs (*Abies*) are especially fine and healthy, and the genus is represented by a large number of good specimens. More conspicuous than any, perhaps, are *Abies concolor* and its ally *A. Lowiana*, both notable for the vividly glaucous tints of their foliage and vigorous growth. The rare *A. bracteata*, over 20 feet high, is in first-rate condition and so is *A. Webbiana*, about as tall. *A. recurvata*, the new Chinese species so well named and so well characterized by its strongly recurved leaves, is growing well, as is also the rare *A. sibirica*, so infrequently seen in good health, but here 9 feet high. Of the commoner species, such as *A. brachyphylla*, *A. cephalonica*, *A. firma*, *A. numidica*, and *A. Veitchii* there are excellent examples.

The spruces (*Picea*) are not inferior in interest to the firs. *Picea polita*, with its rigid, cast-iron-like leaves, makes a handsome tree. Of *P. pungens* var. *glauca* there are numerous specimens, justifying more than ever the popular name of "blue spruce", and growing at a remarkable slant are several plants of the var.

prostrata. Seeing the typical green *P. pungens* as it is here, one could not but feel that this tree has been unduly neglected for its more showy variety. Possibly no one in England has *P. Breweriana*, that rare tree confined in a wild state to a few localities on the Siskiyou Mountains of California and Oregon, better represented than Mr. Cooper. Of several trees in his collection the largest is about 12 feet high. Although it is not so tall as the original specimen introduced to this country (now growing near the Pagoda at Kew) it is not likely, in view of its advantages as to climate and soil, long to remain inferior in stature. *P. Omorica*, the Serbian spruce, thrives excellently here, as, indeed, it does in most places, but Mr. Cooper has a distinctly "weeping" form which we have not seen elsewhere, nor is it mentioned by Dallimore and Jackson in their new book on conifers. As a purely ornamental tree of garden origin, nothing either at Little Hall or Vernon Holme is perhaps quite equal to *Picea orientalis* var. *aurea*, the entire young growth of which is a rich glowing yellow: one tree is 25 feet high. The true *P. Engelmannii*, whose name is so often given to *P. pungens*, is represented by several good specimens.

Of the numerous forms of Lawson cypress, Mr. Cooper has an excellent selection, amongst which was noted as especially well coloured, *C. Lawsoniana* var. *Stewartii*—a very good golden yellow. Another variety distinct in its slender pyramidal shape is var. *Drummondii*, apparently a better hardy substitute for the Italian Cypress than the old variety *erecta viridis*, yet it does not appear to be much known.

Other interesting conifers satisfactorily represented in the collection are *Pinus Balfouriana*, *P. flexilis*, *P. Koraiensis*, *Tsuga Brunoniana*, *Pseudotsuga Douglasii* var. *Stairii* (not often seen now), *Thuya dolabrata*, *Picea retroflexa*, *Abies Pindrow*, *A. Faxoniana*.

The only previous notice of this interesting collection that has appeared was published in the "Gardeners' Chronicle" of May 11th, 1907, p. 305, and the Director and I were very pleased to be able to avail ourselves of Mr. Cooper's kind invitation to visit his Pinetum.

W. J. B.

The Botanical Magazine.—The plants figured in Vol. cxlix (1923) Part iii, which has recently been published, are *Rhododendron calostrotum* Balf. f. (t. 9001), from the alpine zone of North-East Burma; *Boykinia tellimoides* Engl. & Irmischer (t. 9002), a native of the mountains of South and Central Hondo, Japan; *Veronica canescens* T. Kirk (t. 9003A), from South Island, New Zealand; *Cassiope selaginoides* Hook f. & Thoms.—*forma nana* (t. 9003B), which occurs in Sikkim and Western China from the Burma-Tibet-Yunnan frontier to Szechuan; *Magnolia Wilsonii* Rehd. (t. 9004), from Szechuan; *Pentas coccinea* Stapf (t. 9005), a new species, allied to *P. zanzibaricae* Vatke, found on the East African Coast and its Hinterland from the Tanga river to Usambara and also in the Island of Zanzibar; *Lysionotus pauciflorus* Maxim. (t. 9006), a native of S. China and the Yangtse basin, Formosa and the Southern Islands of Japan; *Spencera ramalana* Trimen (t. 9007), an interesting Rosaceous herbaceous plant from Szechuan and Yunnan; *Photinia Davidiana* Cardot (t. 9008), an evergreen shrub also from Szechuan and Yunnan; *Chamaebuxus Vayredae* Willk. (t. 9009), a native of the dry hills in the district of Olot, Catalonia, Spain; *Pimelea prostrata* Willd. (t. 9010), from New Zealand; *Dendrobium laevifolium* Stapf (t. 9011), a new species resembling *D. asperifolium* J. J. Smith, from the hills of Rossell Island in the Louisiades Archipelago near New Guinea and *Centradenia floribunda* Planchon (t. 9012), a native of Guatemala and Western Honduras.

Flora of South Australia, Parts I and II.—The South Australian Branch of the British Science Guild are to be congratulated on the work they have undertaken in preparing a series of "Handbooks of the Flora and Fauna of South Australia."

With regard to the Flora, two out of the three parts which will deal with the vegetation have now been published; Part I commences with the *Pteridophyta* and, following Engler and Gilg's "Syllabus der Pflanzen familien", includes the *Gramineae*, *Cyperaceae*, *Liliaceae*, *Orchidaceae* and other families of Monocotyledons. Part II deals with the Dicotyledonous families from *Casuarinaceae* to *Euphorbiaceae*, including such important Australian families as *Chenopodiaceae*, *Proteaceae* and *Leguminosae*.

The Flora is the work of Mr. J. M. Black, except for the *Orchidaceae* which have been contributed by Dr. R. S. Rogers.

The work is well printed and illustrated by numerous very useful botanical text figures, all of which, with the exception of the orchids—drawn by Miss R. C. Fiveash—are the work of Mr. Black.

Mr. Black has been careful to consult the herbaria in Australia in preparing his Flora and has wisely included the well-established alien plants along with the plants native to Australia, preceding the names of any such aliens with an asterisk. In this way the Flora will be of the fullest value for students, plant lovers and those engaged in Agriculture who wish to know about the native and naturalised plants of the State.

In Part I there is a short introductory chapter giving the History of Botany in South Australia which is followed by a very useful "Glossary of Botanical Terms." A key to the families and a scale of measurements precedes the actual flora and in all these respects the work will prove of great value.

Keys are given under each family to the genera and under each genus to the species so that anyone with a slight knowledge of Botany should be able to identify the plants of the State.

Short descriptions are given of each species, often accompanied by excellent text figures, and the author has been careful to give explanations or translations of all the generic and specific Latin or Greek names. The localities on broad lines and the times of flowering and some general biological details of the species are also given.

It is very gratifying to find a piece of work so well done and to be able to congratulate the author on the preparation of so useful a Flora. which should serve as a model to the other Australian States of the way in which a local flora should be prepared.

Rice.*—Under this title Dr. Copeland has recently contributed a useful, well-printed book. After a necessarily brief account of the plant *Oryza sativa* itself, its range of varieties and economic physiology, the author devotes a short chapter to the agricultural properties of this greatest of the world's crops, and a lengthy one then succeeds on its diseases and pests, the latter being illustrated by two coloured plates. It is explained in the Introduction that there are probably more cultivated varieties of Rice than of all the other cereals put together: it is therefore not surprising that no attempt is made in this book to describe or even enumerate all the varieties, but Chapter iv. includes a general account of the range of variation both morphological and physiological, and a skeleton key to groups of varieties is presented, as well as a very brief account of the results of "pure line" selection. We are informed also that only a single case is known of obtaining a hybrid of economic importance, nevertheless the technique of artificial pollination is fairly fully described. Workers in this field will await with interest the evolution of a workable key to the actual agricultural varieties which the author promises in the course of the next few years. Some idea of the labour entailed in this and in unravelling the intricate problem of synonymy which is inseparable from it, can be formed when it is remembered that about eight thousand varietal names have been recorded from India alone, while the number of Chinese varieties is not even guessed at. The author points out that he has dealt more particularly with cultivation of this crop in the United States and in the Philippines, on the grounds that it is preferable to deal with the crop as found in the areas most familiar to him.

However, in the seventh chapter, entitled "Rice in other lands", useful notes will be found under the respective countries in the Old World where the area under the crop is so many times greater than in the New.

A good index is provided, but there is no Bibliography. In a semi-popular work perhaps the latter is hardly essential, but it would certainly add very greatly to the value of the book, which should command a large sale.

C. V. B. M.

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ROYAL BOTANIC GARDENS, KEW.

BULLETIN
OF
MISCELLANEOUS INFORMATION.

No. 8] [1924

XXXVI.—ON THE FLORA OF THE GALLIPOLI PENINSULA*.

W. B. TURRILL.

SYSTEMATIC LIST AND NOTES.

RANUNCULACEAE.

Adonis cupaniana *Guss.* Syn. ii. 37 (1843).

Kilia, common and abundant, in flower, middle of March 1923, *Ingoldby* 5; and a form with fruits but with smaller flowers and narrower petals than normally, 5.5.23, *Kett* 24.
Distr. V. 1, 2, 2a, 6a, 7.

Anemone coronaria *L.* Sp. Pl. 539 (1753).

Kilia, early March 1923, *Ingoldby* 6; and a variety with dirty cream-yellow sepals received from *Kett*, and in flower at Kew 10.3.24.
Distr. V. 1, 2, 2a, 6, 7, 14.

A. pavonina *Lamk.* Encycl. i. 166 (1783), var. **purpureo-violacea** *Hal.* Consp. Fl. Gr. i. 5 (1900). *A. fulgens* Gay var. *purpureo-violacea* Boiss. Fl. Or. i. 12 (1867).

Kilia, common, late March or early April 1923, *Ingoldby* 18; Anzac, common, in flower, 20.3.23, *Kett* 60.

One of the involucral bracts in one of the flowers of *Kett* 60 has the colour and texture of the sepals.

Judging from herbarium specimens, from field-notes and from my own field observations I conclude there is no sharp line of distinction between *A. stellata* Lam. and *A. pavonina* Lam., at least in the Balkan Peninsula. I hope to investigate this group in cultivation and should be grateful for seeds of wild or cultivated plants from any area.
Distr. (of var.) X. 2, 2a, 3, 6, 6a, 7, 8, 8a.

Clematis flammula *L.* Sp. Pl. 544 (1753).

Boghali, 8.7.23, *Ingoldby* 385.
Distr. VI. 2, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 6b, 7, 11, 12, 13, 14, 15, 16.

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* *Continued from p.* 299.

(18161.) Wt. 152—28 1000 9/24. Wy. & S., Ltd. Gp. 50 (4).

C. vitalba *L.* Sp. Pl. 544 (1753).

Boghali, 7.7.23, *Ingoldby* 386.

Distr. III. 2, 2a, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 6b, 7, 8, 8a, 8b, 9, 10, 10a, 11, 12, 13, 14, 15, 16.

Delphinium aconiti *L.* Mant. prima 77 (1767).

Maidos, in flower and fruit, 14.6.23, *Ingoldby* 332.

Distr. So far as known endemic to the area around the Dardanelles.

This species, which perhaps forms a morphological connecting link between the two genera *Delphinium* and *Aconitum*, has not been represented previously at Kew by any exactly localized specimen. The following specimens belong to this species: ad Hellespontum, *Aucher-Eloy*, Août 1836; Dardanelles, *F. Calvert*, recd. 1867; Dardanelles, in cultis derelictis, 26.8.83, *P. Sintenis*. Linnaeus quotes the *Delphinium orientale annuum, flore singulari* of Tournefort Coroll. 30 (1703) as being this species, but Tournefort gives no locality and I have not discovered that he collected in the Dardanelles area. There is a figure of the species in Vahl Symb. i. 40, t. xiii. (1790).

D. junceum *DC.* Fl. Fr. v. 641 (1815).

Near Gaba Tepe, common in patches in open meadow lands, 10.6.23, *Ingoldby* 308.

Distr. VI. 2, 2a, 3, 3b, 4a, 5, 6a, 6b, 7, 8a, 14.

D. orientale *Gay* in Desmoul. et Maisonn. Pl. de la Dordogne i. 12 (1840).

Kilia, local and rare, 18.5.23, *Ingoldby* 202.

Distr. V. and north to Hungary. 2, 3, 6, 6a, 7, 8, 8a, 8b, 9, 10.

Mr. A. J. Wilmott in Journ. Bot. lxii. 26 (1924) states that *D. orientale* Gay is *D. Ajacis* L., and proposes the name *D. Gayanum* for *D. Ajacis* of Gay and most authors. To use the name *D. Ajacis* for *D. orientale* will cause unnecessary confusion and I propose to retain the name *D. orientale* and to withhold judgment on the names *D. Ajacis* and *D. Gayanum* until the details are published.

D. paniculatum *Host* Fl. Austr. ii. 65 (1831).

Kara Kova Dere, on dry meadow land, in flower and fruit, 30.7.23, *Ingoldby* 531.

Distr. XIX. and to Hungary and Asia Minor. 2, 3, 3b, 4, 5, 6, 6a, 7, 8, 8a, 9, 10, 11, 12, 13, 14, 15, 16.

D. subvelutinum *Heldr. ex R. Buser* in Boiss. Fl. Or. Suppl. 19 (1888). *D. eriocarpum* Hal. Consp. Fl. Gr. i. 32 (1900). *D. peregrinum* var. *eriocarpum* Boiss. Fl. Or. i. 87 (1867).

Angadere, 1.7.23, *Ingoldby* 347.

Distr. XI. 2a, 5, 6a, 7.

D. subvelutinum *Heldr. ex R. Buser* var. **transiens** *Turrill* (comb. nov.). *D. eriocarpum* Hal. var. *transiens* Hal. Consp. Fl. Gr. i. 33 (1900).

Angadere, 1.7.23, *Ingoldby* 346.

Distr. XI. 2a, 5, 6a, 7.

Nigella arvensis *L.* Sp. Pl. 534 (1753).

Maidos, 14.6.23 and 14.7.23, *Ingoldby* 333, 375.

Distr. V. and XII. 1, 2, 3, 3a, 3b, 4, 5, 6, 6a, 6b, 7, 7a, 8, 8a, 9, 10, 11, 13, 14, 16.

Ranunculus arvensis *L.* Sp. Pl. 555 (1753).

Kilia, common, 19–22.4.23, *Ingoldby* 42; Kilia, 25.4.24, *Durham* 114.

Distr. VI. and XII. 1, 2, 3, 4a, 5, 6, 6a, 7, 8, 8a, 8b, 10, 11, 12, 13, 14, 15, 16.

R. flabellatus *Desf.* Fl. Atlant. i. 438, t. 114 (1798).

Kilia, 22.4.24, *Durham* 2.

Distr. V. 1, 2, 2a, 4a, 6a, 7, 10a, 11, 16.

R. flabellatus *Desf.* var. **glabrescens** *Freyn* in Willk. et Lange Prodr. Fl. Hisp. iii. 924 (1880) e descriptione.

Suvla, 24.4.24, *Durham* 51.

Distr. Here and there in the distributional area of the species as a whole.

R. Heldreichianus *Jord.* Obs. vi. 14 (1847); Boiss. Fl. Or. i. 34 (1867); Hal. Consp. Fl. Gr. i. 17 (1900).

Kilia, on ditch banks and in damp places, 19–22.4.23, *Ingoldby* 37.

Distr. XX. 2, 6a.

R. sardous *Crantz* Stirp. Austr. ii. 84 (1763).

Suvla and Anzac, 16.5.24, *Kett* 112.

Distr. VI. and XII. 1, 2, 2a, 3, 3b, 4a, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10, 10a, 11, 12, 13, 14, 15, 16.

R. trichophyllus *Chaix* in Vill. Hist. Pl. Dauph. i. 335 (1786), sensu Boiss. Fl. Or. i. 23 (1867) et Hal. Consp. Fl. Gr. i. 12 (1900).

Helles, in flower and young fruit, 23-24.4.23, *Ingoldby* 78; Suvla, 24.4.24, *Durham* 50.

Distr. III. 1, 2, 3, 3b, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10, 11, 12, 13, 14, 15, 16.

R. velutinus *Ten.* in Ind. sem. hort. Neap. i. 1 (1825), non vidi, et Syllog. Fl. Neap. 272 (1831); Freyn in Oester. Bot. Zeitschr. xxv. 121 (1875) et l. c. xxvi. 157 (1876).

Suvla, in water, 24.4.24, *Durham* 46.

Distr. VI. and XIVa. 1, 2, 3, 4a, 8, 8a, 10, 10a, 11, 13, 14, 16.

BERBERIDACEAE.

Leontice leontopetalum *L.* Sp. Pl. 312 (1753).
Helles, in flower, 26.3.23, *Kett* 20; Anzac, in flower, May 1923, *Kett* 20a; Suvla, in fruit, 17.5.23, *Kett* 37.
Distr. XI. 1, 2, 2a, 3, 6a, 7.

PAPAVERACEAE.

Fumaria Kralikii *Jord.* in Cat. Dijon 19 (1848) et Linnaea xxiii. 471 (1850); Pugsley in Journ. Linn. Soc. xliv. 298 (1919).
Walker's Ridge, Anzac, 90 m., in flower and fruit, 16.5.23, *Kett* 5.
Distr. XI. 2, 3, 6a, 7, 8a, 8b, 10, 14, 16.

Glaucium corniculatum *Curt.* Fl. Lond. vi. t. 32 (1798). *Chelidonium corniculatum* L. Sp. Pl. 506 (1753).
Green Hill, Anzac, in fruit, 16.5.23, *Kett* 32. I do not know the flower colour of this specimen.
Distr. V. and XII. 1, 2, 2a, 3, 5, 6, 6a, 7, 8, 8a, 9, 10.

G. corniculatum *Curt.* var. **flaviflorum** *DC.* Prodr. i. 122 (1824).
Kilia, road-side, in flower and fruit, 11.8.23, *Ingoldby* 550.
Distr. As for the species as a whole.

G. corniculatum *Curt.* var. **phoeniceum** *DC.* Prodr. i. 122 (1824). *G. phoeniceum* S. et S. Prodr. i. 357 (1806) et Fl. Gr. t. 489 (1825).
Anzac, 24.4.24, *Durham* 94.
Distr. Here and there with the other varieties.

G. corniculatum *Curt.* var. **rubrum** *Boiss.* Fl. Or. i. 120 (1867). *G. rubrum* S. et. S. Prodr. i. 357 (1806) et Fl. Gr. t. 488 (1825).
Suvla and Anzac, 16.5.24, *Kett* 105.
Distr. V., but especially in the eastern parts.

G. flavum *Crantz* Stirp. Austr. ii. 141 (1763). *G. luteum* Scop. Fl. Carn. ed. 2, i. 369 (1772).
Jam Baz Dere, common but always near the beach, 8.5.23, *Ingoldby* 158a; Angadere, 28-29.7.23, *Ingoldby* 503; Kara Kova Dere, salt-marsh, 30.7.23, *Ingoldby* 521; Suvla, sand dunes, 5.8.23, *Ingoldby*; Suvla and Anzac, 16.5.24, *Kett* 138.
Distr. VI. and XII. 1, 2, 2a, 4, 4a, 5, 6a, 6b, 7, 8, 8a, 9, 14, 15, 16.

Hypecoum grandiflorum *Benth.* Cat. Pl. Pyr. 91 (1826).
Angadere, common and abundant, early April 1923, *Ingoldby* 23; Anzac, 24.4.24, *Durham* 30; Anzac, in flower and young fruit, 14.5.23, *Kett* 55; Suvla and Anzac, 16.5.24, *Kett* 126, 152.
Distr. V. 2, 2a, 3, 5, 6, 6a, 7, 7a, 8, 8a, 10.

Papaver dubium *L.* Sp. Pl. 1196 (1753) var. vel forma ?
Chunuk Bair (Sari Bair), 22.4.23, *Ingoldby.*
Distr. (of the species sensu lato) V. and XII. 1, 2, 2a, 3, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10, 11, 12, 13, 14, 15.

The morphological characters exhibit a very considerable range within what is usually regarded as the species *P. dubium*, and its taxonomic subdivisions have not yet been satisfactorily decided. Extensive field studies and cultural experiments are needed before the real status of the "varieties", etc., can be found.

P. dubium *L.* var. **albiflorum** *Boiss.* Fl. Or. i. 115 (1867).
Kilia, in flower, 18.5.23, *Ingoldby* 201.
Distr. Here and there with the other varieties, especially in Central and S.E. Europe.

P. dubium *L.* var. **subintegrum** *Fedde* in Engl. und Prantl Pflanzenr. iv. 104, 315 (1909).
Jam Baz, in flower, 8.5.23, *Ingoldby* 163.
Distr. Here and there with the other varieties, especially in Central and S. Europe, the Atlantic Isles and the Orient.

P. rhoeas *L.* Sp. Pl. 507 (1753).
Near Achi Baba, common, 8.5.23, *Ingoldby* 162 ; Maidos, 14.7.23, *Ingoldby* 379.
Distr. II. 1, 2, 2a, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 7, 8, 8a, 9, 10, 10a, 11, 12, 13, 14, 15, 16.

P. rhoeas *L.* var. **strigosum** *Bönningh.* Prodr. Fl. Monast. 157 (1824). *P. strigosum* Schur in Verh. naturf. Ver. Brünn. xv. 5. 66 (1877).
Near Achi Baba, on dry open ground, in flower, 8.5.23, *Ingoldby* 161 (petalis nigro-maculatis) ; Ibrahim Keir, 7.7.23, *Ingoldby* 528 ; without locality, *Ingoldby* 589 ; Kilia, 25.4.24, *Durham* 118.
Distr. V. and XII. 2, 2a, 6a, 14, 16.

P. somniferum *L.* Sp. Pl. 508 (1753).
Jam Baz, 8–11.5.23, *Ingoldby* 192.
Distr. Widely cultivated in the Eastern Mediterranean Region and in Southern and Eastern Asia and often recorded as an escape.

Roemeria hybrida *DC.* Syst. ii. 92 (1821). *Chelidonium hybridum* L. Sp. Pl. 506 (1753).
Helles, common, 23–24.4.23, *Ingoldby* 90 ; Walker's Ridge, Anzac, 90m., in flower, 21.5.23, *Kett* 43.
Distr. III. 1, 2, 2a, 3, 6a, 7, 8a.

CRUCIFERAE.

Alyssum campestre *L.* Sp. Pl. ed. 2, 909 (1763).
Helles, common on open hillsides, 23.4.23, *Ingoldby* 65,
Distr. V. and XII. 2, 2a, 3, 4, 4a, 5, 6, 6a, 6b, 7, 8b, 10, 11, 12, 13, 14, 16.

A. micranthum *Fisch. et Mey.* Ind. Sem. Hort. Petrop. 22 (1835).
Anzac, 24.4.24, *Durham* 28 ; Kilia, 25.4.24, *Durham* 113 ; Suvla and Anzac, 16.5.24, *Kett* 148.
Distr. XI. and XIVa. 2, 3, 6, 6a, 8, 8a, 10.

A. smyrnaeum *C. A. Mey.* in Bull. Soc. Acad. Petersb. vii. 132 (1840).
Helles, 23–24.4.23, *Ingoldby* 91.
Distr. X. 2.

Arabis verna *R. Br.* in Ait. Hort. Kew. ed. 2. iv. 105 (1812) ; Chaub. et Bory Exp. Mor. 188 (1832), et Fl. Pelop. 42 (1838). *Hesperis verna* L. Sp. Pl. 664 (1753).
Kilia, common, 19–22.4.23, *Ingoldby* 54.
Distr. VI. 1, 2, 2a, 3, 4a, 6a, 6b, 7, 8, 11, 13, 14, 15, 16.

Brassica nigra *Koch* in Röhlings Deutschl. Fl. ed. 3, iv. 713 (1833) et Syn. ed. 1, 55 (1835).
Kara Kova Dere, 30.7.23, *Ingoldby* 516.
Distr. V. and XII. 1, 2, 3, 3b, 4, 4a, 6, 6a, 8a, 9, 10, 11, 12, 14, 15, 16.

Bunias erucago *L.* Sp. Pl. 670 (1753).
Kilia, 19–22.4.23, *Ingoldby* 41a ; Suvla, 14.5.23, *Kett* 52 ; Kilia, 24.4.24, *Durham* 18.
Distr. VI. 1, 2, 2a, 4, 4a, 5, 6, 6a, 7, 8a, 10, 11, 13, 14, 15, 16.

Cakile maritima *Scop.* Fl. Carn. ed. 2, ii. 35 (1772). *Bunias cakile* L. Sp. Pl. 670 (1753).
Anzac, near the beach in sand, 27–28.5.23, *Ingoldby* 244 ; Kara Kova Dere, on the beach, 30.7.23, *Ingoldby* 507, 529 ; Suvla, on sand dunes, 5.8.23, *Ingoldby* 544 ; and ripe fruits from Kara Kova Dere.
Distr. IV. and VI. 1, 2, 2a, 3, 4a, 6a, 7, 8, 8a, 9, 11, 13, 14, 15, 16.

Draba verna *L.* Sp. Pl. 642 (1753). *Erophila verna* E. Mey ex Garke, Fl. Deutschl. ed. 4, 35 (1851). *E. vulgaris* DC. Syst. ii. 356 (1821).
Kilia, in flower and fruit, middle of March, *Ingoldby* 30.
Distr. IV. and V. 1, 2, 2a, 3, 4a, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10, 11, 12, 13, 14, 15, 16.

Eruca sativa *Mill.* Gard. Dict. ed. 8 (1768) ; Lam. Fl. Fr. ii. 496 (1778).
Kilia, white flowers, 24.4.24, *Durham* 98.
Distr. V. 1, 2, 2a, 3, 4a, 6a, 7, 8, 9, 12, 14, 15, 16.

Erysimum repandum *L.* Amoen. Acad. iii. 415 (1756).
Kilia, common, 19–22.4.23, *Ingoldby* 41.
Distr. V. and XII. 2, 3, 6, 6a, 8, 8a, 8b, 9, 10, 11, 12, 14, 15, 16.

This species occurs, apparently rather discontinuously, from the Canaries through Central and Southern Europe and the

Orient to as far east as Kashmir, where it has been collected between 1500 and 2100 m.

Lepidium draba *L.* Sp. Pl. 645 (1753).
Kilia, common, 19–22.4.23, *Ingoldby* 50; Kilia, 12.5.23, *Ingoldby* 171; Kilia, the commonest weed at this time, 24.4.24, *Durham* 27; Suvla and Anzac, 16.5.24, *Kett* 117.
Distr. VI. 1, 2, 2a, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10, 11, 12, 13, 14, 15, 16.

Malcolmia chia *DC.* Syst. ii. 440 (1821). *Cheiranthus chius* L. Sp. Pl. 661 (1753). *Wilckia chia* Hal. in Oesterr. Bot. Zeitschr. xlv. 177 (1895) et Consp. Fl. Gr. i. 76 (1900).
Helles, 23-24.4.23, *Ingoldby* 79.
Distr. XI. 1, 2, 2a, 3, 4a, 14.

M. flexuosa *S. et S.* Fl. Gr. t. 634 (1830). *Cheiranthus flexuosa* S. et S. Prodr. ii. 24 (1813). *Wilckia flexuosa* Hal. in Oesterr. Bot. Zeitschr. xlv. 171 (1895) et Consp. Fl. Gr. i. 73 (1900).
Suvla, on the sea shore, pale violet and pinkish flowers, 24.4.24, *Durham* 71.
Distr. X. 1, 2, 2a, 4a, 7.

Matthiola sinuata *R. Br.* in Ait. Hort. Kew. ed. 2, iv. 120 (1812). *Cheiranthus sinuatus* L. Sp. Pl. ed. 2, 926 (1763).
Helles, 23–24.4.23, *Ingoldby* 99; Helles, 28.5.23, *Ingoldby* 268.
Distr. VI. 2, 2a, 4a, 5, 11, 14.

M. tricuspidata *R. Br.* in Ait. Hort. Kew. ed. 2, iv. 120 (1812). *Cheiranthus cuspidatus* L. Sp. Pl. ed. 2, 926 (1763).
Helles, in flower, 24.5.23, *Kett* 46; Angadere, on shingle beach, 18.7.23, *Ingoldby* 457; Angadere, in flower and fruit, 29.7.23, *Ingoldby* 497, 500, 505.
Distr. VI. 1, 2, 2a, 3, 4a, 6a, 7.

Nasturtium officinale *R. Br.* in Ait. Hort. Kew. ed. 2, iv. 110 (1812). *Sisymbrium nasturtium* L. Sp. Pl. 657 (1753). *Nasturtium fontanum* Aschers. Fl. Brand. 32 (1864); Hal. Consp. Fl. Gr. i. 58 (1900).
Boghali, 29.4.23, *Ingoldby* 126; Kara Kova Dere, 30 m., 30.7.23, *Ingoldby* 512.
Distr. II. 1, 2, 2a, 4a, 5, 6, 6a, 7, 8, 8a, 9, 10, 11, 12, 14, 15, 16.

Sinapis arvensis *L.* Sp. Pl. 668 (1753).
Helles, 23–24.4.23, *Ingoldby* 113.
Distr. IV. and V. 1, 2, 2a, 3, 4a, 5, 7, 8, 9, 10, 10a, 11, 12, 13, 14, 15, 16.

Sisymbrium orientale *L.* Cent. Pl. ii. 24 (1756) et Amoen. Acad. iv. 322 (1759), var. **leiocarpum** *Hal.* Consp. Fl. Gr. i. 69 (1900). *Sisymbrium columnae β leiocarpum* DC. Syst. ii. 469 (1821).

Near Gaba Tepe, 10.6.23, *Ingoldby* 311.
Distr. V. 1, 2, 2a, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10, 11, 12, 14, 16.

CAPPARIDACEAE.

Capparis sicula *Duh.* Traité des Arbres ed. 2, i. 159 (1801).
Walker's Ridge, Anzac, 90 m., May 1923, *Kett* 19; Suvla, on or near low sand dunes, 8.6.23, *Ingoldby* 288; very common at Suvla, Anzac and Helles, flowers purple and white, June, fruit Nov. 1923, *Kett* 82. The plant has a tap-root often 4 feet in length.
Distr. V. 1, 2, 3, 5, 6a, 7, 14, 15, 16.

RESEDACEAE.

Reseda lutea *L.* Sp. Pl. 449 (1753).
Kilia, common on open hill-sides and cliff-faces, 19–22.4.23, *Ingoldby* 48, a specimen which has the ovaries and young fruits densely papillose; Kilia, 25.4.24, *Durham* 110.
Distr. V. and XII. 1, 2, 2a, 3, 3b, 6, 6a, 7, 8, 8a, 8b, 9, 10, 11, 12, 13, 14, 15, 16.

CISTACEAE.

Cistus salviifolius *L.* Sp. Pl. 524 (1753).
Walker's Ridge, Anzac, 90 m., in flower, 4.5.23, *Kett* 16; Kilia, common, 22.5.23, *Ingoldby* 215, and a plant with smaller flowers, *Ingoldby* 217.
Distr. VI. 1, 2, 2a, 4, 4a, 5, 6a, 7, 8a, 11, 13, 14, 15, 16.

C. villosus *L.* Mantissa altera 402 (1771).
Kilia, common, 22.5.23, *Ingoldby* 216.
Distr. VI. 1, 2, 2a, 3a, 3b, 4, 4a, 5, 6, 6a, 7, 8, 8a, 8b, 13, 14, 15, 16.

Fumana thymifolia *Verlot.* Cat. Pl. Vasc. Dauph. 43 in Bull. Soc. Statistique 3me. sér. tome iii. (1872); Burn. Fl. des Alpes Marit. 164 (1892), var. **viridis** *Hal.* Consp. Fl. Gr. i. 136 (1900). *Helianthemum viride* Ten. Fl. Nap. i. 299 (1811–1815).
Helles, in flower, 16.5.23, *Kett* 61; Suvla and Anzac, very common on the hill-sides, 16.5.24, *Kett* 88, 137.
Distr. (of var.) VI. 1, 2, 2a, 3, 4a, 6a, 6b, 7.

Helianthemum salicifolium *Mill.* Gard. Dict. ed. 8 (1768); Pers. Syn. ii. 78 (1807). *Cistus salicifolius* L. Sp. Pl. 527 (1753).
Kilia, common, 19–22.5.23, *Ingoldby* 40; Helles, in flower, 24.5.23, *Kett* 45; Walker's Ridge, Anzac, 90 m., in flower, May 1923, *Kett* 49; Kilia, pale yellow flowers, 24.4.24, *Durham* 108.
Distr. V. 1, 2, 2a, 3, 4, 5, 6, 6a, 7, 8, 8a, 8b, 10, 11, 13, 14, 15, 16.

VIOLACEAE.

Viola Kitaibeliana *R. et S.* Syst. v. 383 (1819). *V. arvensis* Murr. var. *Kitaibeliana* Hal. Consp. Fl. Gr. i. 145 (1900).

Helles, common, 23–24.4.24, *Ingoldby* 89.

Distr. VIII. and X. 2, 3, 3a, 3b, 4a, 5, 6a, 7, 8, 8a, 8b, 10, 10a, 13, 15, 16.

V. odorata *L.* Sp. Pl. 934 (1753).

Suan Dere, near the waterfall, Nov. 1923, *Kett* 71.

Distr. III. 1, 2, 3, 3b, 8, 9, 11, 12, 13, 15, 16.

POLYGALACEAE.

Polygala nicaeensis *Risso* in Koch Syn. 92 (1837) et ed. 2, 98 (1843).

Kilia, 23-24.4.23, *Ingoldby* 107.

Distr. VI. and XII. 2, 3, 3a, 3b, 4a, 5, 6, 6a, 8a, 11, 12, 13, 14, 15, 16.

FRANKENIACEAE.

Frankenia hirsuta *L.* Sp. Pl. 331 (1753).

Suvla, salt-marsh, 8.6.23, *Ingoldby* 289.

Distr. III. 1, 2, 2a, 7, 9.

CARYOPHYLLACEAE.

Agrostemma githago *L.* Sp. Pl. 435 (1900).

Jam Baz, 8–11.5.23, *Ingoldby* 179.

Distr. III. 1, 2, 2a, 3, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10, 11, 12, 13, 14, 15, 16.

Arenaria leptoclados *Guss.* Fl. Sic. Syn. ii. 824 (1844), var. **viscidula** *Rouy* in Rouy et Fouc. Fl. Fr. iii. 242 (1896).

Helles, open hillsides, 23.4.23, *Ingoldby* 66.

Distr. III. 1, 2, 2a, 3, 3b, 5, 6, 6a, 7, 7a, 8a, 9, 10, 11, 12, 13, 14, 15, 16.

Cerastium pumilum *Curt.* Fl. Lond. Fasc. vi. t. 30 (1795–1796); Aschers. u. Graebn. Syn. v. i. 657 (1917). *Cerastium glutinosum* Fr. Nov. Fl. Suec. ed. 2, 132 (1828).

Kilia, 19–22.4.23, *Ingoldby* 43a.

Distr. IV. and V. 2, 2a, 3b, 4, 5, 6a, 7, 8, 8a, 8b, 9, 10, 11, 12, 13, 14, 16.

Dianthus calocephalus *Boiss.* Diagn. Ser. I. vi. 23 (1845) var. ?

Angadere, open oak scrub, 27.7.23, *Ingoldby* 484.

Distr. (of species) XI. 7.

This plant may be worth a varietal name. The bract scales are shorter, relative to the length of the calyx, and are less abruptly acuminate at the apex, than those of specimens at Kew. I have not, however, seen the original specimens from (Mt.) Tmolus, Lydia, between Bozdagh and Sardes.

Dianthus Ingoldbyi *Turrill* sp. nov.; ab *D. anatolico* Boiss. Diagn. Ser. I. i. 22 (1842) calycibus longioribus petalis haud roseis distinguitur.

Planta perennis, subcaespitosa, multicaulis, basi leviter suffrutescens. *Caules* erecti, inferne praecipue minute asperuli. *Folia* angustissime linearia, apicem versus in acumen angustum triangulare transientia, basi in vaginam 1·5–2 mm. longam duo confluentia, usque ad 2·6 cm. longa et 2 mm. lata, margine asperulo-serrulata, glauco-viridia. *Inflorescentia* 2-5 flora, ramis lateralibus saepe unifloris, apicem versus floribus 2-3 aggregatis instructa; pedicelli saepe 1 cm. longi squamis 10-12 obtecti: squamae inferiores lineari-lanceolatae, acuminatae, 3-4 mm. longae, superiores calycis basem cingentes, ellipticae vel elliptico-obovatae, apice acuminatae, margine membranaceae. *Calyx* 1·7 cm. longus, glaber, dentibus lanceolatis acuminatis 5 mm. longis, margine membranaceis. *Corolla* obscure pallide ochroleuca vel flavo-viridis, petalorum laminis oblongo-obovatis 4 mm. longis et fere 3 mm. latis apice truncatis minute 5-7 irregulariter dentatis, unguibus angustissime lineari-oblanceolatis 1·6 cm. longis superne 1·25 mm. latis. *Antherae* fere 2 mm. longae. *Ovarium* anguste cylindricum, basi stipo 1 mm. longo instructum, 5·5 mm. altum, glabrum. *Capsula* cylindrica, calyce brevior, carpophoro circiter 2 mm. longo instructa.

Anzac, middle of August, 1923, *Ingoldby* 588.

A sheet in the Kew Herbarium, collected on 29.8.83, " in arenosis prope Maitos " (Maidos), *P. Sintenis* 1061, is also this species.

D. lydus *Boiss.* Diagn. Ser. I. i. 20 (1842) et Fl. Or. i. 513 (1867).

Maidos, in the valley which is partly cultivated and partly open grass-land with a stream accompanied by dense vegetation, magenta flowers, 14.6.23, *Ingoldby* 326; Angadere, 15.7.23. *Ingoldby* 384.

Distr. X.

D. pallens *S. et S.* Prodr. i. 286 (1806) et Fl. Gr. t. 399 (1823).

Angadere, on dry flat hill-top, 150 m., 21.7.23, *Ingoldby* 425. *Distr.* XI. 2, 3, 3a, 4a, 6, 6a, 7, 7a, 8, 8a, 9, 10.

I am not sure that this species can be separated definitely from *D. leptopetalus* Willd. Pl. Hort. Berol. 468 (1809) and if not this latter name has to be retained as is done by Grisebach Spic. Fl. Rumel. i. 191 (1843). In the shorter, broader laminae to the petals and the shorter calyx-tubes Ingoldby's specimen agrees with *D. pallens* S. et S. rather than with the original *D. leptopetalus* Willd.

D. pubescens *S. et S.* Prodr. i. 286 (1806) et Fl. Gr. t. 397 (1823), var. **glanduloso-pubescens** *Hal.* Consp. Fl. Gr. i. 206 (1900).

Suvla, on or near low sand dunes, 3.6.23, *Ingoldby* 287. *Distr.* (of var.) XX. 2, 7a.

Kohlrauschia velutina *Reichb.* Ic. Fl. Germ. vi. 43 (1844).
Dianthus velutinus Guss. Pl. Rar. 166 (1826).

South of Suvla, 24.4.24, *Durham* 88.

Distr. V. 1, 2, 2a, 3, 3b, 4, 4a, 6, 6a, 7, 8a, 8b, 14, 16.

Silene angustifolia *Guss.* Fl. Sic. Prodr. i. 500 (1827), sensu Briquet Prodr. Fl. Cors. 543 (1910).

Angadere, 18.7.23, *Ingoldby* 460.

Distr. II. 1, 2, 2a, 3, 3a, 3b, 4a, 5, 6, 6a, 6b, 7, 8, 8a, 8b, 9, 10, 10a, 11, 12, 13, 14, 15, 16.

S. colorata *Poir.* Voy. en Barb. ii. 163 (1789).

Kilia, common, early April, *Ingoldby* 26; Walker's Ridge, Anzac, 90 m., in flower, 21.5.23, *Kett* 50. Kilia, with much divided petals, pink and white flowered forms seen, 24.4.24, *Durham* 24.

Distr. VI. 1, 2, 2a, 4a, 7.

S. conica *L.* Sp. Pl. 418 (1753).

In fruit, Aug. 1923, *Ingoldby* 602; Kilia, pink flowers, 24.4.24, *Durham* 16.

Distr. III. 2, 3, 3a, 4, 5, 6, 6a, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16.

S. densiflora *d' Urv.* in Mém. Soc. Linn. Par. i. 303 (1822).

Maidos, 14.7.23, *Ingoldby* 377a; Kilia, 8.7.23, *Ingoldby* 408.

Distr. XIVa. 3, 3a, 4, 6, 6a, 7, 8, 8a, 9, 11.

S. dichotoma *Ehrh.* Beitr. vii. 143 (1792) var. **racemosa** *Rohrb.* Monogr. Silene 95 (1868).

Angadere, 26.4.23, *Ingoldby* 116.

Distr. XIII. and XIVa. 6, 7, 8, 8a, 8b, 9, 10, 12, 15.

S. gallica *L.* Sp. Pl. 417 (1753).

Helles, 23-24.4.23, *Ingoldby* 75.

Distr. I. 1, 2, 2a, 4a, 5, 6, 6a, 7, 10, 11, 12, 14, 15, 16.

Spergularia marginata *Kitt.* Taschenb. Fl. Deutschl. ed. 2. 1003 (1844), non vidi; Aschers. u. Graebn. Syn. v. 1, 827 (1919).

Angadere, near the beach, 18.7.23, *Ingoldby* 455; Kara Kova Dere, in flower and fruit, 30.7.23, *Ingoldby* 506; Suvla sand dunes, in flower and fruit, 5.8.23, *Ingoldby* 547.

Distr. III., and S. Africa. 2, 2a, 7, 8, 9, 14, 16.

S. salina *J. et C. Presl* Fl. Čech. 95 (1819); Aschers. u. Graebn. Syn. v. 1, 832 (1919).

Anzac, 27–28.5.23, *Ingoldby* 245.

Distr. I. 1, 2, 2a, 6a, 7, 8, 9, 14, 16.

Velezia quadridentata *S. et S.* Prodr. i. 283 (1806) et Fl. Gr. t. 391 (1823).

Angadere, Biyick Yakajik Tepe, 21.7.23, *Ingoldby* 428.

Distr. XI. 2, 2a, 6a.

PORTULACACEAE.

Portulaca oleracea *L.* Sp. Pl. 445 (1753).

Angadere, near the beach, 28–29.7.23, *Ingoldby* 504.

Distr. I. 1, 2, 2a, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 7, 7a, 8, 8a, 9, 10, 11, 12, 13, 14, 15, 16.

TAMARICACEAE.

Tamarix parviflora *DC.* Prodr. iii. 97 (1828) ?

Suvla, barren, Nov. 1923, 4 to 5 feet in height, *Kett* 65 ; Anzac and Helles, barren, 3 to 4 feet in height, Nov. 1923, *Kett* 66 ; Suvla and Anzac, in flower and young fruit, 16.5.24, *Kett* 120, 121.

Distr. (of species) XI. 1, 2, 2a, 3, 3a, 4a, 5, 6a, 13.

Unfortunately I do not feel quite certain of the identification of the specimens of this genus from Gallipoli, and desire more material in larger specimens. It is possible that two species are represented.

HYPERICACEAE.

Hypericum crispum *L.* Mantissa prima 106 (1767).

Kilia, Aug. 1923, *Ingoldby* 585.

Distr. XI. 1, 2, 2a, 3, 6a, 6b, 7, 7a.

H. perforatum *L.* Sp. Pl. 785 (1753).

Suvla, common, in flower 17.5.23, *Kett* 29 ; Helles, 28.5.23, *Ingoldby* 269.

Distr. III. 1, 2, 2a, 3, 3a, 3b, 4, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10, 10a, 11, 12, 13, 14, 15, 16.

H. Spruneri *Boiss.* Diagn. Ser. I. viii. 112 (1849) et Fl. Or. i. 814 (1867) e descr.

Walker's Ridge, Anzac, 90 m., May 1923, *Kett* 36 ; Anzac, common, 14.5.23, *Kett* 53 ; Suvla, near the beach, 27–28.5.23, *Ingoldby* 243 ; Angadere, 21.7.23, *Ingoldby* 424.

Distr. XX. 2, 3, 3a, 3b, 4, 5.

Our specimens agree with the original description of Boissier, and though no authenticated material is available at Kew or the Natural History Museum for comparison no doubt is felt regarding the identification. Boissier originally described the species from Spruner's specimens collected on Mt. Velugo (Tymphrestus) in Aetolia. Since then the species has been found to have a wide distribution in the southern parts of the Balkan Peninsula and it is strange that specimens have not been received before at Kew.

MALVACEAE.

Althaea canabina *L.* Sp. Pl. 686 (1753).

Angadere, 1.7.23, *Ingoldby* 363, 363a.

Distr. V. 2, 3, 3a, 4, 4a, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10, 11, 12, 13, 14, 15, 16.

A. ficifolia *Cav.* Dissertat. Bot. de Sida, 92, t. 28. f. 2 (1785) var. **chersonesensis** *Turrill* var. nov.; epicalycis segmentis calycis segmentis aequilongis, petalis pallide violaceis distinguitur.
Suvla, 8.6.23, *Ingoldby* 293.
Distr. (of species) XIVa. 7.

A. hirsuta *L.* Sp. Pl. 687 (1753).
Anzac, 27.5.23, *Ingoldby* 257; Angadere, grassy clearing on the summit, 29.7.23, *Ingoldby* 491.
Distr. V. and XII. 1, 2, 2a, 3, 4a, 5, 6, 6a, 7, 8, 8a, 9, 10, 11, 12, 13, 14, 15, 16.

Lavatera punctata *All.* Auct. Fl. Pedem. 26 (1789).
Angadere, 21.7.23, *Ingoldby* 419.
Distr. VI. 1, 2, 3, 4a, 6a, 7, 14.

Malope malacoides *L.* Sp. Pl. 692 (1753).
Kilia, 27–28.5.23, *Ingoldby* 232; Boghali, 7.8.23, *Ingoldby* 387.
Distr. VI. 1, 2, 4a, 7, 14.

M. malacoides *L.* var. **acuminata** *Turrill* var. nov.; ab exemplis vulgaribus epicalycis calycisque segmentis longioribus et majoribus recedit.
Anzac, Brighton Beach, 27.5.23, *Ingoldby* 255.

Malva nicaeensis *All.* Fl. Pedem. ii. 40 (1785).
Suvla and Anzac, 16.5.24, *Kett* 146.
Distr. X. 1, 2, 2a, 3, 6a, 7, 8, 10, 11, 12, 13, 14, 15, 16.

M. silvestris *L.* Sp. Pl. 689 (1753).
Kilia, common and abundant, 19–22.4.23, *Ingoldby* 52; Helles, 28.5.23, *Ingoldby* 277.
Distr. III. 1, 2, 2a, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10, 10a, 11, 12, 13, 14, 15, 16.

LINACEAE.

Linum angustifolium *Huds.* Fl. Angl. ed. 3, 134 (1798).
Angadere, Biyick Yakajik Tepe, 29.4.23, *Ingoldby* 123, and, in fruit, 28–29.7.23, *Ingoldby* 501.
Distr. VI. and to Caucasia and W. Europe. 1, 2, 2a, 3, 3b, 4a, 5, 6a, 7, 8, 8a, 8b, 10, 11, 13, 14, 15, 16.

L. austriacum *L.* Sp. Pl. 278 (1753).
Boghali, 8.7.23, *Ingoldby* 402; Helles, common and abundant, 23–24.4.23, *Ingoldby* 96; Kilia, 25.4.24, *Durham* 115; Suvla and Anzac, 16.5.24, *Kett* 118.
Distr. V. and XIV. 2, 2a, 3, 3b, 4, 4a, 5, 6, 6a, 6b, 7, 8, 8a, 8b, 9, 10, 11, 13, 14, 15, 16.

L. corymbulosum *Reichb.* Excurs. 834 (1832). *L. liburnicum* Scop. Fl. Carn. ed. 2, i. 230 (1772) ? Hal. Consp. Fl. Gr. i. 255 (1900).

Angadere, 22–24.7.23, *Ingoldby* 437.

Distr. V. and south to Abyssinia. 1, 2, 2a, 3, 4a, 6, 6a, 6b, 7, 8a, 10, 11, 13, 14, 15, 16.

L. nodiflorum *L.* Sp. Pl. 280 (1753).

Kilia, 24.5.23, *Ingoldby* 228 ; Angadere, 1.7.23, *Ingoldby* 362.

Distr. V. 1, 2, 2a, 5, 6, 6a, 7, 8a, 8b, 10, 11, 13, 14, 15, 16.

ZYGOPHYLLACEAE.

Tribulus terrester *L.* Sp. Pl. 387 (1753).

Suvla, very common, in flower and fruit, 20.5.23. *Kett* 31 : Angadere, on the beach, in flower and fruit, 28–29.7.23, *Ingoldby* 498, 502 ; Kara Kova Dere, in the salt marsh, 30.7.23, *Ingoldby* 520.

Distr. Ia, 1, 2, 2a, 4, 4a, 5, 6, 6a, 7, 8, 8a, 9, 10, 12, 13, 14, 15, 16.

GERANIACEAE.

Erodium ciconium *L'Hérit.* in Ait. Hort. Kew. ii. 415 (1789) ; Willd. Sp. Pl. iii. 629 (1801). *Geranium ciconium* L. Sp. Pl. ed. 2, 952 (1763).

Kilia, common and abundant, 19–22.4.23, *Ingoldby* 55 ; Suvla, blue-violet flowers, 24.4.24, *Durham* 90.

Distr. VI. 2, 2a, 3, 4a, 6, 6a, 7, 8, 8a, 9, 10, 11, 12, 13, 14, 15, 16.

E. cicutarium *L'Hérit.* in Ait. Hort. Kew. ii. 414 (1789). *Geranium cicutarium* L. Sp. Pl. 680 (1753).

Kilia, common, 19–22.4.23, *Ingoldby* 45.

Distr. I. 2, 2a, 3, 3a, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10, 11, 12, 13, 14, 15, 16.

E. romanum *L'Hérit.* in Ait. Hort. Kew. ii. 414 (1789). *Geranium romanum* L. Sp. Pl. ed. 2, 951 (1763).

Kilia, early April 1923, *Ingoldby* 14.

Distr. VI. 2, 2a, 7.

Geranium dissectum *L.* Amoen. Acad. iv. 282 (1759).

Kilia, 12.5.23, *Ingoldby* 165.

Distr. I. 1, 2, 2a, 3, 4a, 5, 6, 6a, 7, 8, 8a, 8b, 10, 11, 12, 13, 14, 15, 16.

G. molle *L.* Sp. Pl. 682 (1753).

Kilia, common, 19-24.4.23, *Ingoldby* 47, 111.

Distr. III. 1, 2, 2a, 3, 3b, 4a, 5, 6, 6a, 7, 8, 8a, 8b, 10, 11, 12, 13, 14, 15, 16.

G. rotundifolium *L.* Sp. Pl. 683 (1753).

Angadere, 18.7.23, *Ingoldby* 472.

Distr. III. 1, 2, 2a, 3, 3a, 3b, 4a, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10, 11, 12, 13, 14, 15, 16.

G. tuberosum *L.* Sp. Pl. 680 (1753).
Kilia, common and abundant, early April 1923, *Ingoldby* 19.
Distr. III. 1, 2, 2a, 4a, 5, 6, 6a, 7, 8a, 13, 14.

RUTACEAE.

Ruta Buxbaumii *Poir.* in Lamk. Encycl. vi. 336 (1804). *Haplophyllum Buxbaumii* G. Don. Gen. Syst. i. 780 (1831) as *Aplophyllum Buxbaumii.*
Angadere, 22–24.7.23, *Ingoldby* 445.
Distr. X. 1, 7.

RHAMNACEAE.

Paliurus spina-Christi *Mill.* Gard. Dict. ed. 8 (1768).
Helles, with flowers somewhat smaller than usual, 28.5.23, *Ingoldby* 276; Angadere, in fruit, 1.7.23, *Ingoldby* 348, 349; Yalova, *Ingoldby* 573; Angadere, *Ingoldby* 574; Kilia, *Ingoldby* 576, 577; without locality, *Ingoldby* 575, *Kett.*
Distr. V. and north to Hungary and S. Tyrol. 2, 3, 4, 4a, 5, 6, 6a, 6b, 7, 8, 8a, 8b, 9, 10, 11, 13, 14, 15, 16.

ANACARDIACEAE.

Pistacia terebinthus *L.* Sp. Pl. 1025 (1753).
Walker's Ridge, Anzac, 90 m., in fruit, 20.10.22, *Kett* 33; Suvla and Anzac, 16.5.24, a young shoot, somewhat doubtfully determined, *Kett* 109.
Distr. VI. 1, 2, 3, 4, 5, 6, 7, 8a, 8b, 11, 13, 14, 15, 16.

Rhus coriaria *L.* Sp. Pl. 265 (1753).
Jam Baz, end of July 1923, *Ingoldby* 584.
Distr. VI. 2, 3, 5, 6, 6a, 7, 8, 11, 13, 14.

LEGUMINOSAE.

Anagyris foetida *L.* Sp. Pl. 374 (1753).
Jam Baz, in patches, 8–11.5.23, *Ingoldby* 193, 227, later also found at Angadere and Yalova (Sestos); Suvla, 24.4.24, *Durham* 91; Suvla, a bush 3 to 4 feet in height, 16.5.24, *Kett* 142.
Distr. V. 1, 2, 2a, 3, 6a, 7, 14.

Anthyllis Dillenii *Schult.* ex DC. Prodr. ii. 170 (1825) in syn. *A. vulneraria* L. var. *rubriflora* DC. Prodr. ii. 170 (1825).
Kilia, common, often growing through plants of *Cistus*, 4.5.23, *Ingoldby* 140; Jam Baz Dere, common, 8.5.23, *Ingoldby* 155; Suvla, pale pink flowers, 24.4.24, *Durham* 61.
Distr. VI. and XII. 1, 2, 2a, 3a, 4, 4a, 5, 6, 6a, 6b, 7, 8a, 8b, 11, 12, 13, 14, 15, 16.

A. Hermanniae *L.* Sp. Pl. 720 (1753).
Kilia, 2.5.23, *Kett* 30; Maidos, cliff face, 18.5.23, *Ingoldby* 207; Angadere, 1.7.23, *Ingoldby* 364; sometimes sweet-smelling and fairly frequent in very dry places, *Durham.*
Distr. VI. 1, 2, 2a, 4, 4a, 5, 6a, 6b, 7, 7a, 11.

Astragalus anatolicus *Boiss.* Diagn. Ser. I. ii. 77 (1843), var. **parviflorus** *Turrill* var. nov.; a planta Boisseriana floribus minoribus, calycis semisegmentis brevioribus latioribusque recedit.

Angadere, Biyick Yakajik Tepe, about 250 m., early April and 29.4.23, *Ingoldby* 29, 119; in fruit, 22–24.7.23, *Ingoldby* 443; Kilia, dark yellow lemon flowers, 24.4.24, *Durham* 101.
Distr. (of species) X.

Astragalus anatolicus was originally described from Western Asia Minor " in regione montana Cariae et Lydiae, legi fructiferum in Tmolo supra Philadelphiam, in Sypilo et in montibus Cariae Aucher pl. exs. No. 1319 et 1320." In the Flora Orientalis Suppl. 179 (1888) there is added a specimen collected " ad Renkoei Troadis (Sint. 91). *A. Schmidtii* Heldr. exs. (ex Aschers. et Sint.). Specimen eis Sipyli et Tmoli simile." The example of *Sintenis* 91 preserved at Kew is, however, similar to the Gallipoli specimens, and differs from the Kew specimens of *Aucher-Eloy* in having smaller flowers and shorter, broader semi-segments to the calyx. It is possible that the Gallipoli and Troad specimens represent a geographical race, but the morphological characters separating it from *A. anatolicus* do not justify a new specific name on the material now åvailable.

A. Durhamii *Turrill* in Kew Bull. 1923, 294.

Maidos, cliff face, in flower, 18.5.23, *Ingoldby* 210; and fruits collected later.
Distr. Endemic.

The additional material received enables me to amplify and modify the original description. The leaves are sometimes much larger than those originally described, being up to 3 dm. long in the new specimens. The leaflets are up to 4·5 cm. long and 1·3 cm. broad. The fruit is enclosed in the persistent calyx, which becomes enlarged and membranaceous, and corolla, and has long white silky hairs which are much denser in the upper part; it is slightly keeled on both sutures, the adaxial keel being broader than the abaxial; it is nearly ellipsoid with a slight lateral compression, and its length is 8 to 10 mm., its breadth from suture to suture nearly 6 mm., and at right angles to the suture plane 5 mm.; it is completely divided from suture to suture into two loculi by a yellow shining septum. Apparently only one ovule in each loculus normally matures to a seed. It is probable that the fruits described are not quite ripe, for though I opened a number, none of the seeds inside were plump, but all had collapsed. However, some have been sown with the hope that they may germinate.

A. Spruneri *Boiss.* Diagn. Ser. I. ii. 79 (1843) errore *Sprunneri* var. **thessalus** *Boiss.* Fl. Or. ii. 473 (1872).

Astragalus thessalus Boiss. Diagn. Ser. I. ii. 80 (1843).

Suvla, 24.4.24, *Durham* 35, 93.
Distr. (of var.) XX. 3, 6.

A. trojanus *Stev.* in Fisch. Syn. Astrag. Tragacanth. 88 (1853).
Helles, in flower, 6.5.23, *Kett* 8; Kilia, common and abundant, 23.5.23, *Ingoldby* 220 and unlocalized flowering and fruiting specimens: Suvla and Anzac, 16.5.24, *Kett* 97.
Distr. X.

Colutea arborescens *L.* Sp. Pl. 723 (1753).
Angadere, barren shoot, 31.7.23, *Ingoldby* 534; Suvla and Anzac, 16.5.24, *Kett* 143.
Distr. VI. 2, 3, 3b, 4, 5, 6, 6a, 7, 8, 8a, 8b, 10, 10a, 11, 12, 13, 14, 15, 16.

Coronilla parviflora *Willd.* Sp. Pl. iii. 1155 (1800).
Jam Baz, yellow flowers, 8-11.5.23, *Ingoldby* 181; Suvla, 24.4.24, *Durham* 48.
Distr. X. 1, 2, 7.

C. parviflora *Willd.* var. **rubriflora** *Candargy* in Bull. Soc. Bot. Fr. xlv. 186 (1898).
Jam Baz, red-purple flowers, 8-11.5.23, *Ingoldby* 182; Helles, red-purple flowers but smaller than those of 182, 23–24.4.23, *Ingoldby* 103; Suvla, 24.4.24, *Durham* 55; Suvla, brilliant red, 24.4.24, *Durham* 86.
Distr. Here and there with the other varieties over the distributional area of the species.

C. scorpioides *Koch* in Röhlings Deutschl. Fl. v. 201 (1839). *Ornithopus scorpioides* L. Sp. Pl. ed. 2, 1049 (1763). *Astrolobium scorpioides* DC. Prodr. ii. 311 (1825).
Kilia, 25.4.24, *Durham* 112; Suvla, 16.5.24, *Kett* 125.
Distr. V. 1, 2, 2a, 4, 4a, 6, 6a, 7, 8, 8a, 9, 10, 11, 13, 14, 15, 16.

Dorycnium herbaceum *Vill.* Hist. Pl. Dauph. iii. 417 (1789).
Near Gaba Tepe, close to the beach, 10.6.23, *Ingoldby* 315.
Distr. VI. 2, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 6b, 7, 8, 8a, 8b, 10, 10a, 11, 12, 13, 14, 15, 16.

D. hirsutum *Ser.* in DC. Prodr. ii. 208 (1825). *Lotus hirsutus* L. Sp. Pl. 775 (1753).
Kilia, common, 4.5.23, *Ingoldby* 152; Walker's Ridge, Anzac, 90 m., in flower, 16.5.23, *Kett* 27: Angadere, woody sub-shrub, in flower and fruit, 28.5.23, *Ingoldby* 261, a plant with the majority of the leaflets obovate and with shorter calyces than in most of the specimens at Kew; Suvla and Anzac, 16.5.24, *Kett* 110.
Distr. VI. 1, 2, 2a, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 7, 7a, 8b, 11, 13, 14, 15, 16.

Genista anatolica *Boiss.* Diagn. Ser. I. ii. 8 (1843).
Maidos, cliff-face, 18.5.23, *Ingoldby* 204.
Distr. X. 8b.

The indumentum in this species varies from specimen to specimen: that of the Gallipoli specimen agrees very closely with that of specimens collected on the hills round Smyrna by Boissier in 1842.

My friends, Prof. N. Stoianoff and Mr. B. Stefanoff, collected this species on dry limestone rocks at Ortakjoi, E. Rhodope, June 1924, and kindly sent me a specimen.

Gonocytisus angulatus *Spach* in Ann. Sci. Nat. Ser. 3, iii. 154 (1845).

Angadere, 1.7.23, *Ingoldby* 358; Yalova, 30.6.23, *Ingoldby* 392; and fruiting specimens from Anzac; Anzac, hill-sides, 4 to 5 feet in height, flowers rich yellow, in flower and fruit Oct.–Dec. 1923, *Kett* 74.

Distr. X. 7.

The excellent series of flowering and fruiting specimens now received leave no doubt of this species occurring in Gallipoli. A tentative note was published in the *Kew Bulletin* 1921, p. 128, but the specimen on which this was based was incomplete and represented a somewhat aberrant form. The specimens quoted above agree with the Asia Minor specimens preserved at Kew and with the figure in Sibthorp's Flora Graeca, t. 672, under the name *Spartium angulatum*.

Hedysarum varium *Willd.* Sp. Pl. iii. 1206 (1803).

Angadere, 1.7.23, *Ingoldby* 357; Angadere, Biyick Yakajik Tepe, fruits, 21.7.23, *Ingoldby* 429.

Distr. XI. 7.

Hippocrepis unisiliquosa *L.* Sp. Pl. 744 (1753).

Kilia, 19–22.4.23, *Ingoldby* 38; Suvla, yellow flowers, 24.4.24, *Durham* 32.

Distr. VI. 1, 2, 2a, 4a, 6a, 7, 11, 14, 15, 16.

Hymenocarpus circinnatus *Savi*, Flora Pisana ii. 205 (1798).
Medicago circinnata L. Sp. Pl. 778 (1753).

Suvla, dark yellow flowers, 24.4.24, *Durham* 69; Kilia, yellow flowers, 25.4.24, *Durham* 111.

Distr. V. 1, 2, 2a, 3, 3b, 4, 4a, 5, 6a, 6b, 7, 8a, 13, 14, 16.

Lathyrus annuus *L.* Sp. Pl. ed. 2, 1032 (1763).

Suvla and Anzac, 16.5.24, *Kett* 134.

Distr. VI. 1, 2, 2a, 4a, 5, 6, 6a, 7, 8a, 11, 14, 15, 16.

L. aphaca *L.* Sp. Pl. 729 (1753).

Helles, 23-24.4.23, *Ingoldby* 70; Kilia, yellow flowers, 25.4.24, *Durham* 109; Suvla and Anzac, 16.5.24, *Kett* 151.

Distr. V. and W. Europe. 1, 2, 2a, 3b, 4a, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10, 10a, 11, 12, 13, 14, 15, 16.

L. cicera *L.* Sp. Pl. 730 (1753).

Kilia, common and abundant on dry open hill-sides, 19-22.4.23, *Ingoldby* 34; Suvla, muddy Indian red coloured

flowers, 24.4.24, *Durham* 67 ; Suvla and Anzac, 16.5.24, *Kett* 140.
Distr. V. 1, 2, 2a, 3, 4a, 5, 6, 6a, 7, 8, 8a, 8b, 10, 11, 12, 13, 14, 15, 16.

Lotus tenuis *W. et K.* in Willd. Enum. Pl. Hort. Berol. 797 (1809).
Helles, 28.5.23, *Ingoldby* 248.
Distr. III. 1, 2, 2a, 3, 3a, 4, 5, 6, 6a, 7, 8, 8a, 9, 10, 11, 12, 13, 14, 16.

Lupinus albus *L.* Sp. Pl. 721 (1753) var. **termis** *Fiori et Paoletti* Fl. Anal. d'Ital. ii. 10 (1899). *Lupinus termis* Forsk. Fl. Aegypt.-Arab. 131 (1775).
Distr. (of var.) X. 1, 4a, 7, 8a.

From seeds collected in Gallipoli by *Lt.-Col. Durham*, in flower at Kew in May, and in fruit in July, 1923.

With the material available I have failed to find sufficient evidence that *L. termis* Forsk. is specifically distinct from *L. albus* L. Different degrees of development of the bracteoles occur in combination with different grades of hairiness. Since the Gallipoli specimens have bracteoles, although very small ones, and have relatively spreading rather shaggy hairs, I place it as the var. *termis*. More material and field observations are needed to confirm my present opinion or to prove it wrong.

L. angustifolius *L.* Sp. Pl. 721 (1753).
Suvla, blue flowers, 24.4.24, *Durham* 58.
Distr. VI. 1, 2, 2a, 3, 6a, 7.

L. hirsutus *L.* Sp. Pl. 721 (1753) var. **micranthus** *Boiss.* Fl. Or. ii. 28 (1872). *L. micranthus* Guss. Flor. Sic. Prodr. ii. 400 (1828).
Achi Baba, rare and local on dry open ground, 8.5.23, *Ingoldby* 160 : Suvla, blue flowers, 24.4.24, *Durham* 59.
Distr. (of var.) X. 1, 2, 2a, 3b, 7.

Medicago falcata *L.* Sp. Pl. 779 (1753).
Anzac, 27-28.5.23, *Ingoldby* 251 ; Maidos, 7.7.23, *Ingoldby* 372 ; Angadere, 18 and 29.7.23, *Ingoldby* 459, 495.
Distr. III. 1, 2, 3, 3b, 4, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10, 10a, 11, 12, 13, 14, 15, 16.

M. marina *L.* Sp. Pl. 779 (1753).
On sandy beach, in mats, Morto Bay, 23-24.4.23, *Ingoldby* 84.
Distr. VI. 1, 2, 2a, 4a, 6a, 7, 8, 9, 11, 14, 15.

M. minima *Bartal.* Cat. Piant. Siena 61 (1786) var. **mollissima** *Koch* Syn. ed. 1, 164 (1835).
Kilia, common and abundant on dry hillsides, middle of April 1923, *Ingoldby* 33 ; Jam Baz, 8-11.5.23, *Ingoldby* 175.
Distr. (of var.). Probably widely distributed within the dis-

tributional area of the species, which is V. and XII. 1, 2, 2a, 3, 3b, 4a, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10, 10a, 11, 12, 13, 14, 15, 16.

M. sativa *L.* Sp. Pl. 778 (1753).

Kilia, 27–28.5.23, *Ingoldby* 233; Boghali, 8.7.23, *Ingoldby* 409; Kilia, 11.8.23, *Ingoldby* 551.

Distr. III. 2, 3, 3b, 5, 6a, 8, 8a, 10, 11, 12, 14, 15, 16.

Melilotus albus *Desr.* in Lamk. Encycl. iv. 63 (1796).

Kara Kova Dere, growing very luxuriantly on stream-bank, up to 7 or 8 feet in height, 30.7.23, *Ingoldby* 515.

Distr. III. 2, 3, 3b, 4, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10, 11, 12, 13, 14, 15, 16.

M. officinalis *Desr.* in Lamk. Encycl. iv. 62 (1796); Thuill. Flore des Environs de Paris 377 (1799).

Koja Chemen Tepe, 27–28.5.23, *Ingoldby* 234; Kilia, 24.4.24, *Durham* 105.

Distr. III. 2, 2a, 4, 6, 6a, 7, 8, 8a, 8b, 9, 10, 10a, 11, 12, 14, 15, 16.

M. indicus *All.* Fl. Pedem. i. 308 (1785).

Jam Baz, 8–11.5.23, *Ingoldby* 183.

Distr. V. 1, 2, 2a, 3, 4a, 5, 6a, 7, 8, 11, 13, 14, 15, 16.

Onobrychis aequidentata *d'Urv.* in Mém. Soc. Linn. Par. i. 346 (1822). *Hedysarum aequidentata* S. et S. Prodr. ii. 84 (1813) et Fl. Gr. t. 725 (1833).

Suvla, purple flowers, in flower and fruit, 24.4.24, *Durham* 57.

Distr. VI. 1, 2, 2a, 5, 6a, 7, 8a, 11, 14.

O. cana *Hand.-Mazz.* in Oesterr. Bot. Zeitschr. lix. 481 (1909). *O. lasiostachya β cana* Boiss. Fl. Or. ii. 535 (1872).

Helles, 28.5.23, *Ingoldby* 266.

Distr. X.

O. gracilis *Bess.* Enum. Volhyn. 74 (1821).

Open oak scrub, 27.7.23, *Ingoldby* 480. A specimen with rather small flowers and depauperated inflorescences.

Distr. XIII. and XIX. 6a, 7, 8, 8a, 8b, 9, 11.

Ononis antiquorum *L.* Sp. Pl. ed. 2, 1006 (1763).

Angadere, 27.5.23, *Ingoldby* 474.

Distr. V. 1, 2, 2a, 3, 5, 6a, 6b, 11, 12, 13, 14, 15, 16.

O. pubescens *L.* Mant. ii. 267 (1771).

Walker's Ridge, Anzac, 90 m., in flower and fruit, 16.5.23, *Kett* 39; Maidos, cliff face, 18.5.23, *Ingoldby* 211; Anzac 27.5.23, *Ingoldby* 258.

Distr. VI. 1, 2, 2a, 6a.

O. pusilla *L.* Syst. Nat. ed. 10, ii. 1159 (1759). *O. Columnae* All. Syn. Meth. Hort. Taur. u. Auct. 77 (1774), non vidi, et Fl. Ped. 318, t. 20, f. 3 (1785).

Angadere, 1.7.23, *Ingoldby* 350.
Distr. V. and XII. 2. 3a, 3b, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10, 11, 12, 13, 14, 15, 16.

O. repens *L.* Sp. Pl. 717 var. **procurrens** sensu *Asch. & Graebn.* Syn. vi. 2, 345 (1907).
Eski Keui, 3.6.23, *Ingoldby* 279; Angadere, 24.7.23, *Ingoldby* 467.
Distr. IV. 8, 9, 10, 12, 13, 14, 16.

It is with some hesitation that I use this name for the Gallipoli specimens. They are decidedly spiny and have elongated terminal branches on which the flowers are rather loosely arranged. The flowers are 1·5 cm. long, and the indumentum of the stems ranges from finely shortly and densely pubescent to a combination of pubescent and pilose. Glandular hairs occur sparsely on the younger parts only.

Orobus hirsutus *L.* Sp. Pl. 728 (1753).
Kilia, 2–3.5.23, *Ingoldby* 130; Angadere, in open oak scrub, 27.7.23, *Ingoldby* 479.
Distr. XI. 1, 2, 3, 3b, 4, 5, 6, 6a, 6b, 7, 8, 8a, 8b, 10.

O. hirsutus *L.* var. **glabriusculus** *Ser.* in DC. Prodr. ii. 376 (1825). *O. hirsutus* L. var. *glabratus* Griseb. Spic. Fl. Rumel. i. 76 (1843).
Angadere, 27.7.23, *Ingoldby* 478.
Distr. Here and there with other varieties throughout the distributional area of the species.

Pisum arvense *L.* Sp. Pl. 727 (1753).
Jam Baz Dere, 8.5.23, *Ingoldby* 154.
Distr. III. 2, 3b, 4a, 6a, 7, 10, 10a, 11, 12, 13, 14, 15, 16.

Psoralea bituminosa *L.* Sp. Pl. 763 (1753).
Kilia, common, 4.5.23, *Ingoldby* 151, the specimen from an old plant 4 feet or more in height.
Distr. V. 1, 2, 2a, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 6b, 7, 8, 8a, 8b, 11, 13, 14, 16.

P. bituminosa *L.* var. **plumosa** *Beck* in Reichb. Ic. Fl. Germ. xxii. 91 (1903). *P. plumosa* Reichb. Fl. Germ. Exs. 869 (1832).
Kilia, 4.5.23, *Ingoldby* 151a.
Distr. V. 1, 2, 7, 8, 8a, 11, 14.

Scorpiurus subvillosa *L.* Sp. Pl. 745 (1753).
Suvla, deep yellow flowers, 24.4.24, *Durham* 62.
Distr. VI. and to the Crimea. 1, 2, 2a, 4a, 5, 6a, 7, 8a, 11, 14, 15, 16.

Spartium junceum *L.* Sp. Pl. 708 (1753).
Suvla, in flower, 17.5.23, *Kell* 41; Anzac, 27–28.5.23, *Ingoldby* 237.

Distr. VI. 1, 2, 2a, 3, 3a, 4, 4a, 5, 6a, 7, 7a, 8, 11, 12, 13, 14, 15, 16.

Trifolium arvense *L.* Sp. Pl. 769 (1753).
Angadere, 22–24.7.23, *Ingoldby* 440.
Distr. III. and south to Abyssinia. 1, 2, 2a, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 6b, 7, 8, 8a, 8b, 9, 10, 10a, 11, 12, 13, 14, 15, 16.

T. isthmocarpum *Brot.* Phytog. Lusit. Select. i. 148. t. 61 (1816).
Helles, common, 23–24.4.23, *Ingoldby* 101.
Distr. VII.

This species apparently has been recorded hitherto only from the western parts of the Mediterranean Basin, namely Portugal, Spain and N.W. Africa, and from Sicily. The Gallipoli plant agrees well with specimens preserved at Kew from these countries. In the original figure the flowers are inaccurately drawn, especially the calyces and corollas. *T. isthmocarpum* is distinguished from other species morphologically resembling it by the sessile flowers.

T. nigrescens *Viv.* Fl. Ital. Fragm. 12, t. 13 (1808).
Helles, common, 23–24.4.23, *Ingoldby* 76.
Distr. VI. 1, 2, 2a, 3, 3b, 4, 4a, 5, 6, 6a, 7, 8, 8a, 8b, 10, 11, 12, 13, 14, 15, 16.

T. procumbens *L.* Sp. Pl. 772 (1753) sensu *T. campestre* Schreb. in Sturm. Deutschl. Fl. Heft. xvi., t. 13 (1804).
Kilia, common, 19–24.4.23, *Ingoldby* 60, 108: Suvla, 24.4.24, *Durham* 63.
Distr. IV and VI. 2a, 3, 3b, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10, 10a, 11, 12, 13, 14, 15, 16.

T. purpureum *Lois.* Fl. Gall. ii. 484 (1807).
Helles, common, 28.5.23, *Ingoldby* 262; Maidos, 14.6.23, *Ingoldby* 334.
Distr. V. 2, 2a, 3, 3b, 4, 6, 6a, 7, 8, 8a, 8b, 9, 10, 11, 13.

T. repens *L.* Sp. Pl. 767 (1753).
Boghali, common, 29.4.23, *Ingoldby* 128.
Distr. III. 1, 2, 3b, 4, 4a, 5, 6, 6a, 6b, 7, 7a, 8, 8a, 8b, 9, 10, 10a, 11, 12, 13, 14, 15, 16.

T. resupinatum *L.* Sp. Pl. 771 (1753).
Helles, 28.5.23, *Ingoldby* 249; Kilia Bay, 24.4.24, *Durham* 82.
Distr. V. 1, 2, 2a, 3, 4a, 5, 6, 6a, 6b, 7, 8a, 10, 11, 13, 16.

T. spumosum *L.* Sp. Pl. 771 (1753).
Suvla and Anzac, 16.5.24, *Kett* 150.
Distr. V. 1, 2, 2a, 6a, 7.

T. stellatum *L.* Sp. Pl. 769 (1753).
Boghali, 29.4.23, *Ingoldby* 125.
Distr. V. and XII. 1, 2, 2a, 4a, 5, 6, 6a, 7, 11, 13, 14, 15, 16.

T. stellatum *L.* var. **adpressum** *Turrill* var. nov.; a planta vulgari pilis in pedunculo adpressis differt.

Suvla, pale pink flowers, 24.4.24, *Durham* 60; Suvla and Anzac, 16.5.24, *Kett* 116. A specimen in the Kew Herbarium from the Troad: Thymbra, in collibus, 3.5.83, *P. Sintenis* 175, Iter trojanum 1883, is also this variety.

T. uniflorum *L.* Sp. Pl. 771 (1753).

Kilia, common, 23–24.4.23, *Ingoldby* 105; general in the western parts of the Peninsula, white to pinkish flowers, 24.4.24, *Durham* 74.

Distr. VI. 1, 2, 2a, 6a, 6b, 7, 7a, 14.

Trigonella foenum-graecum *L.* Sp. Pl. 777 (1753)?

Anzac, in flower, 20.3.23, *Kett* 54.

Distr. V. and to Caucasus. 1, 2, 6a, 7.

In the absence of ripe fruits I am not quite certain of the identification of the above specimen.

T. gladiata *Stev.* in Fisch. Cat. Hort. Gorenk. 1808, 112, non vidi; Boiss. Fl. Or. ii. 69 (1872).

Helles, common, 23–24.4.23, *Ingoldby* 92, a plant with the leaflets broader and the flowers slightly larger than in most specimens, and in some respects approaching *T. cariensis* Boiss.

Distr. VI. and to Caucasus. 2, 6a, 7, 8, 8a, 9, 10, 13, 14, 16.

T. Spruneriana *Boiss.* Diagn. Ser. I. ii. 17 (1843).

Suvla and Anzac, 16.5.24, *Kett* 141.

Distr. X. 2, 7.

Vicia amphicarpa *Dorthes* in Journ. Phys. xxxv. 131 (1789) non vidi; Hal. Consp. Fl. Gr. i. 478 (1900).

Suvla, purple flowers, 24.4.24, *Durham* 53.

Distr. V. 2, 5, 7.

V. angustifolia *L.* Amoen. Acad. iv. 105 (1759) var. **segetalis** *Koch.* Syn. 197 (1835).

Helles, common, 23–24.4.23, *Ingoldby* 73.

Distr. IV. and VI. 1, 2, 2a, 3b, 6, 6a, 7, 8, 8a, 8b, 9, 10, 10a, 11, 12, 13, 14, 15, 16.

V. cracca *L.* Sp. Pl. 735 (1753).

Helles, common, 23–24.4.23, *Ingoldby* 71.

Distr. III. 2, 4a, 5, 7, 8, 8a, 9, 10, 11, 12, 13, 14, 15, 16.

V. cuspidata *Boiss.* Diagn. Ser. I. ii. 104 (1843).

Helles, common, 23–24.4.23, *Ingoldby* 72, 77.

Distr. X. 6a, 7.

V. grandiflora *Scop.* Fl. Carn. ed. 2, ii. 65, t. 42 (1772).

Suvla, lemon yellow whitish flowers, *Durham* 36, 83.

Distr. X. and XII. 2, 3, 3b, 4a, 5, 6, 6a, 6b, 7, 8, 8a, 8b, 9, 10, 11, 12, 13, 14, 15, 16.

V. hybrida *L.* Sp. Pl. 737 (1753).
Suvla and Anzac, 16.5.24, *Kett* 131.
Distr. VI. and XIII. 1, 2, 2a, 4a, 5, 6, 6a, 7, 8a, 11, 12, 13, 14, 15, 16.

V. lutea *L.* Sp. Pl. 736 (1753) var. **hirta** *Lois.* Fl. Gall. 462 (1807). *Vicia hirta* Balb. ex Pers. Syn. ii. 308 (1807).
Suvla and Anzac, 16.5.24, *Kett* 149.
Distr. V. 1, 2, 2a, 3b, 4a, 6, 6a, 6b, 7, 8, 10, 11, 12, 13, 14, 15, 16.

V. narbonensis *L.* Sp. Pl. 737 (1753).
Helles, common on open hillsides, 23.4.23, *Ingoldby* 62; Suvla, purple and whitish flowers, 24.4.24, *Durham* 85.
Distr. VI. 2, 3, 5, 6, 6a, 6b, 7, 8, 8a, 9, 11, 13, 14, 15, 16.

V. peregrina *L.* Sp. Pl. 737 (1753).
Kilia, common and abundant on dry hillsides, middle of April 1923, *Ingoldby* 32; Suvla, flowers pale blue-mauve and whitish inside, 24.4.24, *Durham* 52, 66.
Distr. VI. 1, 2, 2a, 4, 5, 6, 6a, 7, 8, 8a, 9, 10, 11, 13, 14, 15, 16.

V. sativa *L.* Sp. Pl. 736 (1753) var. **cordata** *Arcang.* Comp. Fl. Ital. ed. 2. 524 (1894); Hal. Consp. Fl. Gr. i. 479 (1900). *Vicia cordata* Wulf in Sturm. Deutschl. Fl. Heft 32 (1812).
Jam Baz, 8–11.5.23, *Ingoldby* 185.
Distr. (of var.) V. 1, 2, 2a, 3b, 4a, 5, 6a, 10, 11, 12, 13, 14, 15, 16.

V. tenuifolia *Roth.* Tent. Fl. Germ. i. 309 (1788) var. **stenophylla** *Boiss.* Fl. Or. ii. 586 (1872).
Jam Baz, 8–11.5.23, *Ingoldby* 187; Walker's Ridge, Anzac, in flower and with immature fruits, 16.5.23, *Kett* 7.
Distr. (of var.) III. 1, 2, 3, 6a, 7, 8, 8a, 8b, 9, 10, 11, 13, 14.

V. villosa *Roth.* Tent. Fl. Germ. ii. 2. 182 (1793).
In masses all over Gallipoli, in the valleys, 1922, *Durham*; Suvla, red purple flowers, 24.4.24, *Durham* 49.
Distr. IV. and V. 2, 2a, 3, 3b, 6, 6a, 7, 8, 8a, 9, 10, 11, 12, 13, 14, 15, 16.

ROSACEAE.

Agrimonia eupatoria *L.* Sp. Pl. 448 (1753) var. **major** *Boiss.* Fl. Or. ii. 728 (1872).
Maidos, 14.7.23, *Ingoldby* 373.
Distr. III. 2, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10, 10a, 11, 12, 13, 14, 15, 16.

Cotoneaster pyracantha *Spach* Hist. Veg. ii. 73 (1834). *Mespilus pyracantha* L. Sp. Pl. 478 (1753).
Between Sogaule Dere and Jam Baz, in flower, 8–11.5.23, *Ingoldby* 184.
Distr. VI. and to Caucasus and Crimea. 3a, 3b, 4, 5, 6, 6a, 7, 7a, 8a, 11, 12, 14.

C. pyracantha *Spach* var. **aurantiaca** *Turrill* var. nov.; ab planta vulgari baccis aurantiacis differ .

Suan Dere, in fruit, Nov. 1923, *Kett* 79. In a letter to me Kett says " the *Cotoneaster* is not plentiful, the berries were a beautiful deep orange colour, the shrub about three feet high, growing in sandy clay at about 90m. altitude." Capt. Ingoldby's specimen is in flower only and may or may not belong to this variety.

Cydonia oblonga *Mill.* Gard. Dict. ed. 8 (1768) sensu Schneider, Ill. Handb. i. 654 (1906).

Angadere, early April 1923, *Ingoldby* 20.

Distr. V. 2, 2a, 3, 4, 4a, 6a, 7, 8, 8a, 8b, 10, 12, 14, 15, 16.

Potentilla hirta *L.* Sp. Pl. 497 (1753).

Jam Baz, 8–11.5.23, *Ingoldby* 180; Angadere, in open oak scrub, 27.7.23, *Ingoldby* 485; Kilia, golden yellow flowers, 24.4.24, *Durham* 14.

Distr. V. 2, 3, 3a, 3b, 4, 5, 6, 6a, 7, 7a, 8, 8a, 8b, 9, 10, 11, 12, 13, 14, 15, 16.

P. hirta *L.* var. **laeta** *Aschers. & Graebn.* Syn. vi. i. 768 (1904).

Angadere, 22–24.7.23, *Ingoldby* 432.

Distr. (of var.) XIX. and Italy, and S. Russia. 3a, 3b, 5, 6, 6a, 8, 8a, 9, 10, 11, 12, 13, 14, 15, 16.

Poterium sanguisorba *L.* Sp. Pl. 994 (1753).

Hill 1141, N.W. of Angadere, 27.7.23, *Ingoldby* 536; common in the western parts of the Peninsula, 23–24.4.23, *Durham* 54.

Distr. III. 1, 2, 3, 3a, 3b, 4, 5, 6, 6a, 6b, 7, 8, 8a, 8b, 10, 10a, 11, 12, 13, 14, 15.

P. spinosum *L.* Sp. Pl. 994 (1753).

Common prickly shrub, almost everywhere in the western parts of the Peninsula, 24.4.24, *Durham* 70.

Distr. VI. 1, 2, 2a, 3, 4, 4a, 6a, 6b, 7, 7a, 11, 13, 14, 15.

Pyrus amygdaliformis *Vill.* Cat. Pl. Jard. Strasb. 323 (1807) non vidi; Boiss. Fl. Or. ii. 654 (1872).

Kara Kova Dere, in fruit August 1923, *Ingoldby* 562; Suvla, 1923, a slender tree about 16 feet in height, *Kett* 63.

Distr. VI. and to the Crimea. 1, 2, 2a, 3, 3a, 3b, 4, 5, 6, 6a, 7, 8, 8a, 8b, 10, 10a, 11, 13, 14, 15, 16.

P. domestica *Smith* Engl. Bot. t. 350 (1796) ?

Angadere, 24.7.24, *Ingoldby* 475.

Distr. VI. and South Russia. 2, 2a, 3, 3a, 3b, 6, 6a, 8, 8a, 10, 12, 13, 14, 15, 16.

The specimen is barren and the determination is therefore tentative.

Rosa sempervirens *L.* Sp. Pl. 492 (1753); S. et. S. Fl. Gr. t. 483 (1825); Aschers. u. Graebn. Syn. vi. i. 36 (1900) var. **opaca** Uechtr. ex Christ in Boiss. Fl. Or. Suppl. 229 (1888).

Eski Keui, 3.6.23, *Ingoldby* 280.

Distr. X. 7.

Other specimens of this variety in the Kew Herbarium are: Dardanelli: in valle Rhodii fl., 28.5.83, *P. Sintenis* Iter trojanum 1883, Nr. 844; Rumeli-Hissar, June 1877, *Post* 367. Christ, l.c., considers this a hybrid, *R. sempervirens* × *dumetorum*. I am not convinced that this is the correct view, since the three specimens at Kew, from different localities and by different collectors, have the same morphological characters. The plants are obviously connected morphologically with *Rosa sempervirens* but differ from the widely distributed varieties in the pinnatifid foliaceous calyx segments. For the present I prefer to consider them a variety of *R. sempervirens*.

Rubus tomentosus *Borkh.* in Roem. Neu. Mag. Bot. i. 2 (1794), sensu Hal. Consp. Fl. Gr. i. 504 (1900).

Helles, 28.5.23, *Ingoldby* 275.

Distr. VI. and XII. 2, 3, 3a, 3b, 5, 6, 6a, 6b, 7, 8, 8a, 8b, 9, 10, 11, 12, 13, 15, 16.

R. ulmifolius *Schott* in Isis 1818, 821, non vidi, var. **anatolicus** *Focke* ex Heldr. Herb. Gr. Norm. 844a (1884); Hal. Consp. Fl. Gr. i. 503 (1900). *R. anatolicus* Focke in Abh. Nat. Ver. Brem. ix. 335 (1886).

Boghali, 8.7.23, *Ingoldby* 388.

Distr. V. and XII. and east to Ceylon. 2, 2a, 3, 4, 5, 6, 6a, 7, 8, 8a, 8b, 10, 11, 13, 14, 15, 16.

CRASSULACEAE.

Sedum altissimum *Poir.* in Lamk. Dict. iv. 634 (1796).

Maidos, in the valley, 14.6.23, *Ingoldby* 330.

Distr. VI. 1, 2, 2a, 4a, 6b, 7, 7a, 15.

MYRTACEAE.

Myrtus communis *L.* Sp. Pl. 471 (1753).

Suvla, in fruit, 20.11.22, *Kett* 65; seeds also from Koja Dere. A shrub 2 to 4 feet in height, only growing near water or where the soil is damp. The natives use the leaves for flavouring in the same manner that bay leaves are used.

Distr. V. 1, 2, 2a, 3, 4, 4a, 5, 7, 7a, 11, 13, 14, 15, 16.

LYTHRACEAE.

Lythrum salicaria *L.* var. **tomentosum** *DC.* Cat. Hort. Monsp. 123 (1813). *Lythrum tomentosum* Mill. Gard. Dict. (1768).

Angadere, near the beach, 18.7.23, *Ingoldby* 456.

Distr. (of species) I. 2, 3, 3a, 3b, 4, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10.

11, 12, 13, 14, 15, 16. The variety *tomentosum* occurs with other varieties in the distributional area of the species, but especially in the Mediterranean Region.

Punica granatum *L.* Sp. Pl. 472 (1753).
Suvla, 8.6.23, *Ingoldby* 301.
Distr. V. 1, 2, 3, 3a, 3b, 5, 6, 6a, 7, 7a, 11, 13, 14, 16.

(*To be continued.*)

XXXVII.—MISTLETOE ON OAKS.

L. A. Boodle.

Prof. K. von Tubeuf's elaborate work on the Mistletoe (Monographie der Mistel, 1923) includes chapters dealing very thoroughly with the geographical distribution and the host-plants of the Mistletoe. Three races or varieties of the Common Mistletoe (*Viscum album*) are recognised[1], two of which occur, in nature, only on Conifers, while the third ('Laubholzmistel') is found on various Dicotyledonous plants.[2]

Reports on the distribution and host-plants of the Mistletoe were obtained from forestry officials and others in different countries of Europe by Tubeuf, who also made an extensive study of the literature of the subject, and a critical examination of many of the records and statements.

One of the facts brought out clearly by this study is that mistletoe parasitic on oaks is rare in comparison with its occurrence on other hosts. For England, this fact is illustrated by the information contained in an article published by Prof. Somerville[3] in 1914, and including records of the occurrence of mistletoe on different host-plants, supplied in that year by fifteen correspondents in different parts of the country. Only two of these correspondents mentioned cases of the mistletoe parasitic on oaks, while the total records included nineteen genera of host-plants. In Germany it appears that no more than two fully authenticated cases of mistletoe on native oaks are known, while, for Italy, Tubeuf accepts Pollini's statement that mistletoe is not found on oaks in that country.[4]

An enquiry was received recently at Kew as to whether there is any record of the mistletoe growing on the Holm Oak (*Quercus Ilex*), the question having arisen in connection with certain lines of Virgil, which will be referred to below.

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[1] See Tubeuf's earlier work:—Die Varietäten oder Rassen der Mistel, Naturwiss. Zeitschr. f. Land- und Forstwirtschaft, vol. 5, 1907, p. 321.

[2] For these races or varieties, three varietal names have been proposed, viz. *Viscum album* vars. *Abietis*, *Pini* and *Mali*; see Tubeuf, Monogr. d. Mistel, p. 669.

[3] Somerville, Naturwiss. Zeitschr. f. Land- und Forstwirtschaft, vol. 12, p. 207.

[4] Tubeuf, Monogr., pp. 724 and 726.

Mistletoe parasitic on Holm Oak appears to be unknown. It occurs on *Quercus pedunculata* and *Q. sessiliflora*, but Tubeuf (p. 727) states that there is no certain record of its occurrence on other oaks of central Europe, although it is found on some of the introduced American species of *Quercus*.[1] According to Tubeuf (p. 762), moreover, the variety of the common mistletoe which grows on Dicotyledons (' Laubholzmistel ') has not been observed, in nature, on any evergreen tree or shrub, either in Germany, where the Flora is certainly poor in evergreens, or in the South of Europe, where they are more numerous.[2]

One may conclude, therefore, that mistletoe either does not grow on the Holm Oak, or only as an extremely rare occurrence. The mistletoe is, however, occasionally parasitic on *Loranthus europaeus*, which grows chiefly on oaks, and, as Tubeuf points out (pp. 98 and 726), this fact is accountable for a certain number of erroneous records of mistletoe on oaks in South-East Europe, etc., the leafy mistletoe being conspicuous in winter, when the *Loranthus*, on which it is growing, has shed its leaves and may be easily overlooked. *Quercus Cerris* L. and *Q. lanuginosa* Thuill. (*Q. pubescens* Willd.) are among the host-plants of *Loranthus europaeus*[3], but whether the Holm Oak can be added as a host is uncertain.[4]

The lines of Virgil referred to above are 205–209 of book VI of the Aeneid :—

> Quale solet silvis brumali frigore viscum
> Fronde virere novâ, quod non sua seminat arbos,
> Et croceo foetu teretes circumdare truncos :
> Talis erat species auri frondentis opacâ
> Ilice ; sic leni crepitabat bractea vento.

It may be noted that opinions have not been quite unanimous as to the use of the words ' viscum ' and ' ilex ' by Virgil. Bubani[5] suggests that in certain cases ' viscum ' may mean *Loranthus europaeus*, and mentions that, though most of the commentators on Virgil take ' ilex ' to mean *Quercus Ilex*, Schrank maintains that *Q. coccifera* is intended. Schrank's view is not supported by Bubani nor by Sargeaunt.[6]

In the passage from Virgil quoted above, there seems to be no reason against interpreting ' ilex ' as Holm Oak, while the context of the word ' viscum ' should fix the meaning as mistletoe.

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[1] On *Q. palustris* and *Q. rubra* in Germany. One of the two records of mistletoe on oaks in England, referred to above, was on *Q. rubra*, the other being on the Common Oak.

[2] The mistletoe can, however, be artificially induced to grow on the evergreen *Nerium Oleander* (Tubeuf, p. 762).

[3] Schneider, Ill. Handb. d. Laubholzkunde, 1906, vol. 1, p. 248 ; Tubeuf, Monogr., p. 726.

[4] Nobbe, in Ber. deutsch. bot. Gesellsch., vol. 2, 1884, p. 343, records the occurrence of *Loranthus europaeus*, at Pirna in Saxony, on " Steineiche " and " Stieleiche." Though " Steineiche " properly means *Quercus Ilex*, it appears more probable that *Q. sessiliflora* was intended.

[5] Bubani, Flora Virgiliana, 1876, p. 130 ; also p. 64 (Ilex).

[6] Sargeaunt, The Trees, Shrubs and Plants of Virgil, 1920, p. 61.

Virgil's description, however, does not amount to a statement that mistletoe grows on the Holm Oak, but rather refers to a magic golden leafy branch on that tree (cf. the earlier lines of the same book of the Aeneid :—135–144), similar to mistletoe in appearance, but, as appears to be implied by the Latin words used, consisting of metallic gold.[1]

Theophrastus describes, according to Hort's translation[2], both *Loranthus europaeus* and *Viscum album* as growing on a species of oak, which he calls Prinos (πρῖνος) and which Hort interprets as Kermes Oak (*Quercus coccifera*). Tubeuf's opinion[3] is that the mistletoe in this case may have been parasitic on *Loranthus* growing on the oak[4], and that the Prinos here referred to by Theophrastus was not *Quercus coccifera*, but that his description was based on a composite impression of the characters of the Kermes Oak and of another species of *Quercus*.

Viscum cruciatum, the only other European species of this genus, is found in Palestine and in Spain, but has not apparently been recorded on oaks. The Olive is stated to be its most frequent host.

XXXVIII.—MISCELLANEOUS NOTES.

The following appointments have been made by the Secretary of State for the Colonies :—

CAPT. J. F. C. O'BRIEN, Senior Agricultural Officer, Tanganyika Territory ; MR. C. K. LATHAM, B.Sc., District Agricultural Officer, Tanganyika Territory ; MR. R. R. GLANVILLE, B.A. Agr. B., Provincial Superintendent, Agricultural Department, Sierra Leone.

MR. A. G. BAILEY, Economic Botanist, Department of Agriculture, Trinidad, has been appointed Senior Supervisor, Agricultural Department, Kenya. (*K.B.* 1921, p. 319.)

The Cultivation of New Zealand Plants.[*]—Within a compass of some 140 pages, Dr. Cockayne has produced an interesting book. It is a distinct break away from the usual gardening manual, for we believe it to be the only gardening book devoted entirely to the flora of one country, thus giving it the unique position of being a link between the scientist and the enthusiastic amateur gardener.

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[1] See translations of the Aeneid by Fairclough, by Owgan and Mongan, notes of Anthon, etc. Tubeuf (Monogr., p. 20) writes : "der [goldene] Zweig des Aeneas heisst nicht geradezu Mistel, er ist nur das traumhafte Abbild einer solchen."

[2] Theophrastus, Enquiry into Plants, with Eng. transl. by Sir A. Hort, 1916, Book 3, ch. 16, par. 1.

[3] Tubeuf, Monogr., p. 12, notes 1 and 2.

[4] No case of mistletoe on oak being known in Greece.

[*] By L. Cockayne, Ph.D., F.R.S., F.L.S. Whitcombe & Tombs, Ltd., Christchurch, New Zealand (and at 9, St. Andrews Hill, London, E.C. 4.). Price 4s. 6d.

Dr. Cockayne has not only a wide knowledge of the ecology of the New Zealand Flora, but has also been a keen cultivator of all New Zealand plants, and his many years' experience in this direction is to be found woven throughout the text of this book.

The book is divided into various chapters, such as "Trees Suitable for Cultivation", "Herbs, Semi-woody Plants and Grasses Suitable for Cultivation", "Climbing Plants Suitable for Gardens", etc. A whole chapter is devoted to those interesting plants the Veronicas, and brief references are made to about one hundred species of this genus.

Dr. Cockayne pays particular attention to the habitats of the 800 species mentioned in the book, and records at what elevation each species grows. He also notes whether a plant is "hardy", "half-hardy" or "very hardy", which should prove a useful guide to those who may wish to cultivate them in this country. Wherever possible, the native or Maori names are also given.

The unbounded love of the author for his native flora and the desire that the rising generation of the Dominion should take an interest in and respect the flora of their land, three-quarters of which is to be found nowhere else in the world, is easily seen in the last three chapters, viz.: "Plants for Decorating the Home", "Native Plants for School Grounds and Children's Gardens", and "Native Plants for Town Gardening."

It is mainly through the indomitable spirit and untiring efforts of the author that a greater interest is now being taken by the people of New Zealand in the rich and unique flora that clothes her shores and mountains, and his new publication may be taken as his crowning effort and contribution to this ever-increasing enthusiasm. The book is full of helpful information not only for gardeners in our Dominions but for growers in England and abroad. It is written in the typical style of the author, lucid, instructive and full of interest. It contains a coloured plate of *Leptospermum scoparium* var. *Nichollsii*, besides 24 illustrations from photographs of various plants. An appendix in a condensed form and under various headings gives the names of plants suitable for various situations.

J. A. McP.

Rhododendrons for Amateurs.*—"This volume, as its title implies, is strictly utilitarian in its purpose. It has been written in order to supply amateur growers of this fascinating genus with information of a simple and practical nature." With these opening remarks Mr. E. H. M. Cox gives the prospective reader a very good idea of the trend and tone in which the book is written. Its appearance is certainly very opportune. The introduction of many new species of Rhododendrons from China by Wilson, Forrest, Farrer, Kingdon-Ward and others, has created a widespread interest in the cultivation of the species. Gorgeous as are the magnificent large-leaved hybrids when in flower, out of bloom the foliage lacks the wide variety of the species, and many cultivators will be in agreement with the author when he remarks "Frankly I have a decided preference for Rhododendron species compared with most hybrids." A large proportion of the 120 odd pages are occupied with descriptions of about 150 species, arranged in their respective series. The cultural details are often of special value, the author sometimes giving valuable hints on the peculiar likes or dislikes of individual species. Here is an example, "*R. orbiculare* . . . I suggest planting it in rich soil in half shade, and to keep the plant continually mulched with leaves. The moment they disappear another layer should be placed on the soil around the roots." The first chapter dealing with the distribution and habit of Rhododendron species is interesting and instructive to amateurs and professionals alike, for Mr. Cox has seen many of the plants growing in their native habitats, and cultivated them in his Scotch garden. Useful information to the grower is afforded in a chapter dealing with situation, soil, wind, sun and rain, propagation and the nursery. The book is illustrated with fifteen full page plates, one of the most interesting being a row of *R. fictolacteum* photographed by Mr. George Forrest in China. Towards the end of the book a tabulated list of the best hybrids is given, with the colour and time of flowering. Select lists of twelve species of Rhododendrons for half-a-dozen different uses in the garden provide the beginner with a starting point.

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* Rhododendrons for Amateurs, by E. H. M. Cox. Country Life, Ltd., London, pp. 112 and xvi., pl. 15, price 5s.

Mr. Cox is to be congratulated on the publication of a useful book for garden lovers, made doubly interesting by the frank manner in which the author places his experiences and views at the service of his readers. A. O.

Bougainvillea "Mrs. Butt".—This fine claret-coloured Bougainvillea, which is apparently a colour variety of *B. spectabilis*, was discovered in the year 1910 growing in a Priest's garden near Carthagena, Colombia, by Mrs. R. V. Butt, wife of the Manager of the Colonial Bank, Trinidad. Cuttings were brought back to Trinidad, where they were rooted by the Curator of the Botanic Gardens, and the plant is now a favourite plant in most gardens in Trinidad.

As it strikes very readily from cuttings its propagation affords no difficulty, unlike *B. lateritia*, which can only be propagated with great difficulty by means of root cuttings. Plants of the Mrs. Butt variety were sent to Kew from Trinidad a few years ago, and the large plant in No. 5 Greenhouse flowers freely and retains its good colour under greenhouse treatment. It can also be successfully grown as a small pot plant as cuttings will flower when only a foot or two high.

Galium flavicans.—The name *Galium flavicans* Borb. is used by Degen in Mag. Bot. Lap. iv. 126 (1905), by Košanin l.c. viii. 209 (1909), and by Urumoff l.c. xii. 218 (1913). I have failed to trace it but apparently it is a mistake for *G. flavescens*. The latter name is given by Borbás in Math. és Termés. Kozlémenyek M. Tudományos Akadémia xi. 266 (1873) (title page dated Budapest 1876), as a substitute for *G. ochroleucum* Kit. in Schultes Osterr. Flora I. 305 (1814) non Wolf in Schw. et Koerte Fl. Erlang. 36 (1811). The *G. ochroleucum* of Wolf is generally regarded as a hybrid between *G. verum* L. and *G. mollugo* L. If one accepts homonyms and does not use the binary combination *G. ochroleucum* for the hybrid then the name *G. ochroleucum* Kit. can be retained for the species as in Nyman's Consp. 328, nr. 56 (1879). If, however, homonyms are rejected or the binary combination *G. ochroleucum* Wolf is retained for the hybrid then the name *G. flavescens* Borb. stands.

In his Enum. Flor. Transsilv. 281 (1886) Simonkai rejects the name *G. flavescens* Borb., substituting the new name *G. marisense* Simk. He does this on the ground that an earlier *G. flavescens* was published by Wierzb. ex Heuff. in Verhl. Zool. Bot. Ges. viii. 124 (1858). The name *flavescens*, however, is here used only for a var. β of *G. purpureum* L., and no binary combination is made. Simonkai, l.c., gives a complete list of synonyms.

W. B. T.

The Biology of Flowering Plants.*—Dr. Macgregor Skene has produced a very stimulating and living book. His aim being " to give an account of the way in which the flowering plant lives, especially in relation to its environment ", he treats the plant as an individual rather than as a member of a community, and approaches the problems of biology from the physiological standpoint. With a wealth of examples he not only traces the normal developments, but also mentions many of the noteworthy exceptions. Both in the case of illustrations and examples he has endeavoured to call attention to those which are not found as a rule in textbooks, and thereby enhances the value of his work.

Dr. Skene deals with his subject under the following chapters : (i) The Absorption of Water and Salts, (ii) Assimilation and Transpiration, (iii) Special modes of Nutrition, (iv) Mechanical Problems, Protection, (v) Reproduction and Dispersal, and (vi) Development. These he subdivides fully, and discusses each in the light of our latest knowledge. The book is well illustrated by carefully chosen copies, excellent original drawings by Miss A. M. Davidson, and by 8 half-tone plates. The book will be of very great interest to botanists and plant lovers ; it is attractively written, the descriptions are lucid, the arrangement is clear, and there is a comprehensive bibliography of about six hundred references.

K.W.B.

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* By Macgregor Skene, D.Sc. Sidgwick & Jackson, Ltd., London, 1924, 8vo., pp. 523, 68 illustrations in text, 8 plates. Price 16/-.

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ROYAL BOTANIC GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

No. 9] [1924

XXXIX.—ON THE FLORA OF THE GALLIPOLI PENINSULA.*

W. B. TURRILL.

UMBELLIFERAE.

Apium graveolens *L.* Sp. Pl. 264 (1753).
Near Gaba Tepe, 10.6.23, *Ingoldby* 303.
Distr. I. 1, 2, 2a, 3, 3a, 4, 6, 6a, 7, 8, 9, 14, 15, 16.

Bupleurum apiculatum *Friv.* in Flora xviii. i. 335 (1835).
Near Gaba Tepe, 10.6.23, *Ingoldby* 309. Later found universally covering large areas.
Distr. XX. 2, 3, 3a, 4, 6, 6a, 7, 8, 8a, 8b, 9, 10.

B. gracile *DC.* Prodr. iv. 128 (1830). *Odontites gracilis* M. B. in Hoffm. Gen. Umb. ed. 2, 209 (1816) et in Fl. Taur.-Cauc. iii. 198 (1819). *B. Marschallianum* C. A. Mey. Verzeichn. Pfl. Cauc. 123 (1831).
Kara Kova Dere, salt marsh, 30.7.23, *Ingoldby* 517; and 11.8.23, *Ingoldby* 548.
Distr. XI. and Caucasus. 2, 2a, 3, 6a, 7, 8, 8a.

B. subovatum *Link* in Spreng. Spec. Umbell. 19 (1818). *B. protractum* Hoffm. et Link Fl. Portug. ii. 387 (1820), non vidi, ex Wolff in Pflanzenr. iv. 228. 46 (1910).
Helles, 28.5.23, *Ingoldby* 273.
Distr. V. and XII. 1, 2, 2a, 3, 4a, 5, 6a, 7, 11, 13, 14, 15, 16.

Caucalis latifolia *L.* Syst. ii. ed. 12, 205 (1767).
Kilia, Mal Tepe, common, 18.5.23, *Ingoldby* 203; Suvla and Anzac, 16.5.24, *Kett* 104.
Distr. III. 1, 2, 3, 3b, 4, 6, 6a, 7, 8, 8a, 8b, 9, 10, 11, 12, 13, 14, 15, 16.

Conium maculatum *L.* Sp. Pl. 243 (1753).
Angadere, 15.7.23, *Ingoldby* 369.
Distr. III. 1, 2, 3, 3b, 5, 6, 6a, 7, 8, 9, 10, 11, 12, 14, 15, 16.

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* Continued from *K.B.*, 1924, p.331.

(13180.) Wt. 152—23. 1,000. 10/24. Wy. & S., Ltd. **Gp. 50** (4).

Crithmum maritimum *L.* Sp. Pl. 246 (1753).
Suvla, 5.8.23, *Ingoldby* 540.
Distr. VI. and W. Europe. 1, 2, 2a, 3b, 4a, 5, 6a, 7, 11, 14, 15, 16.

Daucus carota *L.* Sp. Pl. 242 (1753).
Maidos, in the valley, 14.6.23, *Ingoldby* 328; Angadere, on dry flat hill-tops, 21.7.23, *Ingoldby* 422.
Distr. III. 1, 2, 2a, 3, 4, 5, 6a, 7, 8, 8a, 8b, 9, 10, 10a, 11, 12, 13, 14, 15, 16.

The Maidos specimen is not quite the same as that from Angadere. In some respects it approaches *D. maximus* Desf., but it is not so large as most examples which I have seen of this. which can scarcely be regarded as a distinct species from *D. carota.*

Echinophora tenuifolia *L.* Sp. Pl. 239 (1753).
Kara Kova Dere, salt marsh, 30.7.23, *Ingoldby* 522.
Distr. XI. 1, 2, 2a, 3, 3a, 6, 6a, 7, 9.

Eryngium creticum *Lamk.* Encycl. iv. 754 (1796).
Kilia, 9.7.23, *Ingoldby* 396.
Distr. XI. and Egypt. 1, 2, 2a, 3, 3a, 4a, 5, 6, 6a, 6b, 7, 7a, 11, 14, 16.

E. maritimum *L.* Sp. Pl. 233 (1753).
Suvla, on the beach, 8.6.23, *Ingoldby* 296.
Distr. V. and W. Europe. 1, 2, 2a, 3, 5, 6a, 7, 8, 9, 14, 15, 16.

Ferulago monticola *Boiss. et Heldr.* Diagn. Ser. II. ii. 91 (1856).
Helles, 28.5.23, *Ingoldby* 260; Angadere, in open oak scrub, in fruit, 27.7.23, *Ingoldby* 476.
Distr. XX. 2, 3, 3a, 3b, 4, 6, 6a, 6b, 8, 8a, 10.

This species was originally described from specimens collected by Heldreich "in dumosis prope Rachova ad radices Parnassi", and an example of this collection is preserved at Kew. In the Flor. Or. ii. 1002 (1872) Boissier added other specimens as follows: mons Chelmos (Orph.), Olympus Thessalus (Heldr., Orph.), Athos (Griseb.), Korthiat (Friv., Orph.). Janka, in Termész. Füzetek iii. pte. iv. 1879, published a paper on this species separating the three species *Ferulago silvatica* (Bess.) Reichb., *F. monticola* Boiss. et Heldr. and *Lophosciadium meifolium* DC. [*Ferulago meoides* (L.) Boiss.] His main points are that *Lophosciadium* is a distinct genus and that Boissier in the Flor. Or. confused two plants together under the name *Ferulago monticola*, namely *F. monticola* Boiss. et Heldr. (Diagn.) and *Lophosciadium meifolium* DC. This latter conclusion is, however, based on uncertain grounds because Janka did not see the Grisebachian and other specimens quoted by Boissier but only collected the plants in Grisebach's locality on Mt. Athos and in other parts of the Eastern Balkan Peninsula.

Hayek, in Fritsch Neue Beitr. z. Fl. d. Balkanhalbinsel v. in Mitt. Naturwiss Vereins. f. Steiermark li. 37–39 of reprint (1915), records *F. monticola* from a number of localities in Serbia.

but makes the curious mistake of saying that the specimens of Sintenis and Bornmüller Nr. 1249, from Mt. Olympus, are from one of the original localities. Only Heldreich's collection from near Rachova is quoted in the original diagnosis. The Olympian plant is *F. monticola,* in my opinion, but it is referred to *F. silvatica* by Halácsy. Hayek, moreover, separates from *F. silvatica* plants from Transsilvania, and one from Serbia, Mt. Basara, as *F. commutata* Roch. In so doing I do not think he is right. Most authors now refer the Italian *F. Barrelieri* Ten. to *F. silvatica* (Bess.) Reichb.

Halácsy in Consp. Fl. Gr. i. 643–644 (1901) records both *F. monticola* and *F. silvatica* from his area. He describes the latter as differing from the former "fructu parvo, ovato, 6–7 mm. longo, margine corticosa, seminis diametro 3–4 plo angustiore," and quotes Sint. et Bornm. it. turc. n. 1249, Thessalia: Mt. Olympus pr. Hagios Dionysios, and Achaia: pr. Megaspilaeon (Heldr.). I have not seen a specimen of the latter but the specimen of the former at Kew does not agree with the description he gives since the fruits average 1 cm. long by 0–5 cm. broad. Indeed, I think this specimen must be referred to *F. monticola,* and it is doubtful if true *F. silvatica* (Bess.) Reichb. occurs at all in the southern parts of the Balkan Peninsula. An original sheet of the latter received from Besser, Volhynia, is at Kew from the Gay Herbarium. Besser originally described the plant in Enum. Pl. Volh. 44 (1822) under the genus *Ferula,* and the transference to *Ferulago* was made by Reichenbach Fl. Crit. iv. 53 (1826).

Foeniculum vulgare *Mill.* Gard. Dict. ed. 8 (1768). *F. capillaceum* Gilib. Fl. Lith. iv. 40 (1785).

Maidos, 14.7.23, *Ingoldby* 377.

Distr. V. and XII. 1, 2, 3, 4, 7, 8, 10, 11, 14, 15, 16.

Hippomarathrum cristatum *Boiss.* in Ann. Sci.-Nat. Ser. 3. ii. 75 (1844). *Cachrys cristatum* DC. Prodr. iv. 238 (1830).

Suvla, 17.5.23, *Kett* 21; Helles, 27–28.5.23, *Ingoldby* 252.

Distr. VI. 1, 2, 6, 6a, 6b, 7, 8a, 8b.

Orlaya platycarpos *Koch* in Nov. Act. Nat. Cur. xii. i. 79 (1824). *Caucalis platycarpos* L. Sp. Pl. 241 (1753).

Kilia, 23–24.4.23, *Ingoldby* 109.

Distr. VI. 1, 2, 2a, 3b, 6, 6a, 6b, 7, 8a, 8b, 11, 13, 14, 15.

Scandix pecten-veneris *L.* Sp. Pl. 256 (1753).

Kilia, 19–22.4.23, *Ingoldby* 49; Kilia, 24.4.24, *Durham* 99.

Distr. VI. and XII. 1, 2, 2a, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 7, 8, 8a, 9, 10, 11, 12, 13, 14, 15, 16.

Tordylium apulum *L.* Sp. Pl. 239 (1753).

Kilia, in fruit, 2.5.23, *Kett* 9; Kilia, common, 12.5.23, *Ingoldby* 170; Kilia Bay, in fruit, *Durham*; Kilia, 24.4.24, *Durham* 26.

Distr. VI. 1, 2, 2a, 3, 4a, 6a, 7, 11, 13, 14, 15, 16.

T. officinale *L.* Sp. Pl. 239 (1753).
Helles, 28.5.23, *Ingoldby* 263.
Distr. VIII. 1, 2, 2a, 3, 3b, 4a, 5, 6, 6a, 7, 11, 13, 14, 16.

ARALIACEAE.

Hedera helix *L.* Sp. Pl. 202 (1753).
Suan Dere, growing on a rock in a shady situation near a waterfall, barren, Nov. 1922, *Kett* 73 ; Jam Baz, 6.5.23, *Ingoldby* 583.
Distr. III. 1, 2, 3, 3a, 3b, 4, 5, 6, 6a, 7, 7a, 8, 9, 10, 11, 12, 13, 14, 15, 16.

CAPRIFOLIACEAE.

Lonicera caprifolium *L.* Sp. Pl. 173 (1753).
Anzac, 27–28.5.23, *Ingoldby* 236. A plant with the leaves hairy on the lower surfaces. *Kett* 86, from Anzac, Nov. 1922, is probably this species.
Distr. III. 2, 2a, 4, 4a, 5, 6, 6a, 7, 8, 10, 11, 12, 13, 15, 16.

Sambucus nigra *L.* Sp. Pl. 269 (1753).
Jam Baz Dere, 6.5.23, *Ingoldby* 561.
Distr. IV. and XIVa. 1, 2, 3, 3b, 4, 4a, 5, 6a, 7, 8, 8b, 9, 10, 11, 12, 13, 14, 15, 16.

RUBIACEAE.

Asperula arvensis *L.* Sp. Pl. 103 (1753).
Kilia, common, 19–22.4.23, *Ingoldby* 58, and on dry flat low ground, 1.5.23, *Ingoldby* 118.
Distr. V. and XII. 2, 4a, 5, 6, 6a, 6b, 7, 8, 8b, 10, 11, 12, 13, 14, 15, 16.

A. montana *W. et K.* ex Willd. Enum. Hort. Berol. 151 (1809).
Kilia, June-July 1923, *Ingoldby* 581.
Distr. XIX. 7, 8, 8a, 9, 10.

The above plant I consider to be closely related to *Asperula graveolens* M.B. ex Besser in Schult. Mant. Syst. iii. 376 (1818). Indeed, if this species is accepted in the sense of Boissier, Flora Orientalis iii. 41 (1875), the Gallipoli plant must be included within it. It is evident, however, from an examination of the material preserved in Boissier's own herbarium and very kindly loaned to Kew by Prof. Chodat of Geneva, that a number of distinct, even if "small", species were lumped together by Boissier, whose description, moreover, is a generalised one. Some of these microspecies form morphological connecting links with *A. cynanchica* L.

Asperula rumelica Boiss. was originally described by Boissier, Diagn. Ser. II. ii. 113 (1856), from specimens collected by him "in planitiebus incultis (Steppes) Rumeliae littoralis circà Kustendje. Legi floriferam fructiferamque Augusto 1842." It also is taxonomically near to the Gallipoli specimen. Kustendje is an old name for Constanta on the Black Sea in the Roumanian Dobruja. In 1842 Boissier visited the Orient, including Constantinople and its neighbourhood, and Prof. Chodat has discovered for me through Mr. Barbey, in whose possession are the Boissierian papers and manuscripts, that Boissier visited Constanta in this year. *Asperula rumelica* is reduced by Boissier himself in the Flora Orientalis to *A. graveolens* M.B., but, in my opinion, wrongly. It seems well distinguished from a small original specimen of *A. graveolens* preserved at Kew, by its much smaller externally puberulous corolla. It may be noted that Boissier describes the corolla of *A. graveolens* as " valde scabrido-pubescentis", but in the original description the wording is " laciniis . . . . glabris . . . . tubo . . . . extus quidquam rugoso." In the Kew specimen already mentioned the corolla is externally glabrous or slightly but coarsely papillose. *A. rumelica* is best regarded as a variety of *A. montana* or kept as a distinct microspecies.

In Boissier's herbarium there is a specimen collected near Mudania in July 1874 (?) by Pichler, Nr. 214, and another collected near Constantinople by Noé. I take both to be *Asperula montana* W. et K. A specimen of Noé's is also at Kew with a fuller label including the date 1845, and the name *Asperula Lechleri* Noé, a name which has apparently never been published.

Our plant differs from *A. graveolens* M.B. in the smaller corolla, its shape, and its densely finely papillose exterior.

I am not certain what *A. cynanchica* (var.) *homophylla* Clem. Sert. 46 (1855) may be, since the original description is too imperfect, and the specimen in Boissier's herbarium is fragmentary, but it is possibly *A. montana*.

From specimens preserved in the Kew Herbarium it is evident that *A. montana* is distributed at least from Hungary right down the eastern side of the B. P. to Gallipoli and Eastern Thrace. I also include in it *A. pirotica* Adamovic (see Magyar Bot. Lapok 1908, 107) from the Pirot district of eastern Serbia.

Galium laconicum *Boiss. et Heldr.* Diagn. Ser. I. vi. 66 (1845).
Angadere, 18.7.23, *Ingoldby* 463.
Distr. XX. 2, 3b, 4, 6, 6a.

I fail to find any differences, which I can regard as specific, between this specimen and specimens of *Orphanides* 185 from mt. Malevo, Laconiae, 4,000 ft., preserved in the Kew Herbarium. Specimens from Southern (Greek) Macedonia, which I previously referred to this species, I now believe to be *G. pseudoaristatum* Schur.

G. mollugo *L.* Sp. Pl. 107 (1753) var. **pubescens** *Schrad.* Spic. Fl. Germ. 16 (1794).
Helles, 28.5.23, *Ingoldby* 274.

Distr. (of species) IV. and XIVa. 2, 3, 3b, 4, 4a, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10, 11, 12, 14, 15, 16.

The variety occurs here and there throughout the distributional area of the species as a whole.

G. tricorne *With.* Bot. Arrangem. Brit. Pl. ed. 2, ii. 153 (1787).
Boghali, common, 29.4.23, *Ingoldby* 124.
Distr. V. and XII. 1, 2, 6, 6a, 7, 8, 8a, 10, 11, 12, 13, 14, 15, 16.

G. verum *L.* Sp. Pl. 107 (1753).
Suvla, common, in flower, 20.5.23, *Kett* 26; Eski Keui, 3.6.23, *Ingoldby* 283a.
Distr. III. 2, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10, 11, 12, 13, 14, 15, 16.

Rubia Olivieri *Rich.* in Mém. Soc. Nat. Par. 132 (1834).
Kilia, greenish flowers, 24.4.24, *Durham* 100; Suvla and Anzac, 16.5.24, *Kett* 93.
Distr. X. 1, 2.

Sherardia arvensis *L.* Sp. Pl. 102 (1753).
Kilia, 19–22.4.23, *Ingoldby* 56; Kilia, flowers purplish, 24.4.24, *Durham* 13.
Distr. V. and XII. 1, 2, 2a, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 7, 8, 8a, 10, 11, 12, 13, 14, 15, 16.

VALERIANACEAE.

Valeriana officinalis *L.* Sp. Pl. 31 (1753).
Suvla, pinkish flowers, 24.4.24, *Durham* 40.
Distr. III. 3, 4, 4a, 6, 6a, 8, 8a, 8b, 9, 10, 11, 12, 13, 14, 15, 16.

Valerianella coronata *DC.* in Lamk. et DC. Fl. Fr. ed. 3, iv. 241 (1805).
Kilia, 23–24.4.23, *Ingoldby* 110; Walker's Ridge, Anzac, 90 m., in flower, 21.5.23, *Kett* 51.
Distr. V. and XII. 2, 2a, 3, 4, 4a, 6, 6a, 6b, 7, 8, 8a, 8b, 9, 10, 13, 14, 15.

DIPSACEAE.

Callistemma palaestinum *Heldr.* Herb. Norm. 1148 (1891), non vidi, et in Bull. Herb. Boiss. vi. 302 (1898). *Knautia palaestina* L. Mant. altera 197 (1771).
Kilia, common, 2–3.5.23, *Ingoldby* 135; Angadere, on slopes, in flower and fruit, 29.7.23, *Ingoldby* 493.
Distr. X. and west to Italy. 1, 2, 2a, 3, 3a, 3b, 4, 4a, 6, 6a, 6b, 7, 8b, 14, 16.

Knautia integrifolia *Bert.* Fl. Ital. ii. 32 (1835). *Scabiosa integrifolia* L. Sp. Pl. 99 (1753).
Helles, common, 28.5.23, *Ingoldby* 265; Boghali, 8.7.23, *Ingoldby* 390. The former specimen is very incomplete and the determination is tentative.

Distr. VI. 1, 2, 2a, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 7, 8, 8a, 8b, 10, 11, 12. 13, 14, 16.

Pterocephalus plumosus *Coult.* Mém. sur les Dipsac. 31 (1823). *Knautia plumosa L.* Mant. altera 197 (1771).

Angadere, in fruit, 22–24.7.23, *Ingoldby* 448.

Distr. XI. 1, 2, 3, 6, 6a, 8, 8a.

Scabiosa ucranica *L.* Sp. Pl. ed. 2, 144 (1762). *Scabiosa argentea* L. Sp. Pl. 100 (1753) ?

Near Gaba Tepe, 10.6.23, *Ingoldby* 310; Maidos, 15.6.23, *Ingoldby* 338.

Distr. V. 2, 3, 3b, 5, 6a, 7, 8, 8a, 8b, 9, 10, 11.

COMPOSITAE.

Anacyclus clavatus *Pers.* Syn. ii. 465 (1807): *Anthemis clavatus* Desf. Fl. Atl. ii. 287 (1798).

Helles, 23–24.4.23, *Ingoldby* 104.

Distr. VI. 2, 14.

Anthemis austriaca *Jacq.* Fl. Austr. v. 22 (1778).

Kilia, 2–3.5.23, *Ingoldby* 132; Jam Baz, 8–11.5.23, *Ingoldby* 186.

Distr. X. and XII. 6, 6a, 7, 8, 8a, 10, 11, 12, 13, 14, 15.

A. montana *L.* Sp. Pl. ed. 2, 1261 (1762) sensu Hal. Consp. Fl. Gr. ii. 55 (1902).

Walker's Ridge, Anzac, in flower, 17.5.23, *Kett* 40.

Distr. VI. and XII. 1, 2, 3, 3b, 4, 5, 6, 6a, 6b, 7, 8, 8a, 8b, 10, 11.

A very large number of varieties are recognized within what is generally regarded as the one species *A. montana.* The Gallipoli plant comes nearest to the var. *tenuiloba* Boiss. Fl. Or. iii. 291 (1875), but the young shoots are more whitely tomentose than in the specimens of this variety available for comparison. In the absence of achenes I have to leave the determination at the species *sensu lato.*

A. tinctoria *L.* Sp. Pl. 896 (1753).

Kilia, common, 24.5.23, *Ingoldby* 221; Angadere, 22–24.7.23, *Ingoldby* 434, a depauperated form.

Distr III. 2, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 6b, 7, 8, 8a, 8b, 9, 10, 11, 12.

A. tomentosa *L.* Sp. Pl. 893 (1753).

Suvla, white ray and yellow disc florets, 24.4.24, *Durham* 75.

Distr. X. 2, 4a, 6a, 7.

Artemisia monogyna *W. et K.* Icon. Pl. Rar. Hung. i. 77, t. 75 (1802) var. **microcephala** *DC.* Prodr. vi. 103 (1837).

Suvla, 5.8.23, *Ingoldby* 549.

Distr. (of var.) XIII. and east to the Caspian Region.

The specimens collected by Capt. Ingoldby agree in a remarkable manner with specimens from Odessa, sent by Besser and preserved at Kew. These are written up by Besser as "Artemisia maritima L. o Kitaibeliana mihi var. nutans." I have found no publication of the "var. nutans" but "o Kitaibeliana" was published by Besser in the Bull. de la Soc. Impér. des Natural. vii. (1834), page 40 in the Kew copy of the paper, which is possibly a reprint. It is based essentially on *A. monogyna* W. et K. The Gallipoli plant and the Odessa specimens already mentioned do not agree in certain respects with the Hungarian specimens of *A. monogyna* which I have seen, or with the original figure, but from the description fit into the var. *microcephala* DC., which is said to be distributed "ad Odessam, in Tauriâ, circa mare Caspium, Sareptam, Irentiam, etc." The Odessa and Gallipoli plants are taller, much more branched and the leaves are more canescent, while the capitula, though very young, would probably be much smaller when mature than in typical *monogyna*. Until further material in flower and fruit is received I prefer not to make a new species based on these plants, although I realize that they may prove worthy of specific rank.

Bellis silvestris *Cyr.* Pl. Rar. ii. 42, t. 4 (1787), non vidi; Boiss. Fl. Or. iii. 174 (1875).
Angadere, in open oak scrub, 27.7.23, *Ingoldby* 482.
Distr. VI. 1, 2, 2a, 3a, 4, 5, 6a, 7, 8a, 10, 11, 13, 14, 15, 16.

Calendula arvensis *L.* Sp. Pl. ed. 2, 1303 (1763); D. Lanza in Atti Reale Accad. Palermo xii. 111 (1923).
Kilia, common and abundant, in flower and fruit, 19–22.4.23, *Ingoldby* 46; Suvla, 24.4.24, *Durham* 45.
Distr. V. 1, 2, 2a, 3, 4, 4a, 6a, 7, 7a, 11, 14, 15, 16.

Cardopatium corymbosum *Pers.* Syn. ii. 500 (1807). *Carthamus corymbosus* L. Sp. Pl. ed. 2, 1164 (1763).
Maidos, 14.7.23, *Ingoldby* 397.
Distr. X. and west to Italy. 1, 2, 2a, 3, 6a, 7, 7a.

Carduus pycnocephalus *L.* Sp. Pl. ed. 2, 1151 (1763).
Kilia, common, 12.5.23, *Ingoldby* 172; Kilia, pale mauve flowers, 24.4.24, *Durham* 17.
Distr. V. and XII. 1, 2, 2a, 3, 4, 4a, 5, 6, 6a, 7, 8, 8a, 11, 13, 14, 15, 16.

Carlina graeca *Heldr. et Sart.* ex Boiss. Fl. Or. iii. 449 (1875).
Kilia, Aug. 1923, *Ingoldby* 557.
Distr. XX. 2, 2a, 3, 3b, 5, 6a, 7a.

C. lanata *L.* Sp. Pl. 828 (1753).
Suvla, sand dunes, 5.8.23, *Ingoldby* 542.
Distr. VI. 1, 2, 2a, 3, 4, 4a, 5, 6a, 7, 14, 15.

Carthamus dentatus *Vahl.* Symb. i. 69 (1790).
Kilia, Aug. 1923, *Ingoldby* 556.
Distr. VI. 1, 2, 3, 3a, 3b, 6, 6a, 6b, 7, 7a, 8a, 8b.

Centaurea diffusa *Lamk.* Encycl. i. 675 (1783).
Near Gaba Tepe, close to the beach, 10.6.23, *Ingoldby* 320 ; Angadere, 18.7.23, *Ingoldby* 458 ; Kilia, Aug. 1923, *Ingoldby* 554.
Distr. X. and XIII. 3, 3a, 6, 6a, 6b, 7, 8, 8a, 8b, 9, 16.

C. salonitana *Vis.* in Flora xii. i. Erg. 23 (1829) var. **macrantha** *Boiss. et Heldr.* Diagn. Ser. II. iii. 78 (1856).
Maidos, 14.7.23, *Ingoldby* 374.
Distr. (of var.) XX. 1, 2, 3b, 6a, 7.

C. solstitialis *L.* Sp. Pl. 917 (1753).
Maidos, 15.6.23, *Ingoldby* 339 ; Kilia, Aug. 1923, *Ingoldby* 555.
Distr. III. 1, 2, 2a, 3, 4, 4a, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10, 11, 12, 13, 14, 15, 16.

C. spinosa *L.* Sp. Pl. 912 (1753) var. **tomentosa** *Hal.* in Bull. Herb. Boiss. vi. 634 (1898).
Kilia, 8.7.23, *Ingoldby* 400 ; Suvla and Anzac, in bud, 16.5.24, *Kett* 107.
Distr. (of species) X. 1, 2, 2a. The variety probably to be found throughout the species area.

C. Triumfetti *All.* Fl. Pedem. i. 158 (1785).
Helles, 28.5.23, *Ingoldby* 267.
Distr. XII. 2, 3, 3b, 4, 5, 6, 6a, 7, 8, 8a, 8b, 10, 11, 12, 13, 14, 15, 16.

Chondrilla juncea *L.* Sp. Pl. 796 (1753).
Yalova, 30.6.23, *Ingoldby* 391.
Distr. III. 1, 2, 2a, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 7, 8, 8a, 9, 10, 11, 12, 13, 14, 15, 16.

Chrysanthemum coronarium *L.* Sp. Pl. 890 (1753).
Maidos, in a gully, 18.5.23, *Ingoldby* 209, with large capitula, and 14.7.23, *Ingoldby* 370 ; Kilia, 25.4.24, *Durham* 118, with paler yellow ray florets ; Kilia, 24.4.24, *Durham* 97, with darker yellow ray florets.
Distr. V. 1, 2, 2a, 4a, 6a, 7, 14, 15.

C. segetum *L.* Sp. Pl. 889 (1753).
Maidos, in a gully, 18.5.23, *Ingoldby* 208 ; Kilia, 24.4.24, *Durham* 96.
Distr. VI. and XVIII. 1, 2, 2a, 3, 4, 4a, 6a, 7, 14.

Cichorium intybus *L.* Sp. Pl. 813 (1753) var. **glabratum** *G. et G.* Fl. Fr. ii. 286 (1850). *Cichorium glabratum* Presl Fl. Sic. i. p. xxxii. (1826).
Helles, 27 28.5.23, *Ingoldby* 240 ; Angadere, 18.7.23, *Ingoldby* 461.
Distr. III. 1, 2, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10, 11, 12, 13, 14, 15, 16.

Crupina vulgaris *Cass.* Dict. Sci. Nat. xii. 68 (1818). *Centaurea crupina* L. Sp. Pl. 909 (1753).

Kilia, common, 4.5.23, *Ingoldby* 141; Anzac, in flower, 20.5.23, *Kett* 25.

Distr. III. 2, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 7, 7a, 8, 8a, 8b, 9, 10, 11, 12, 13, 14, 16.

Diotis maritima *Smith* Engl. Flora iii. 403 (1825). *Filago maritima* L. Sp. Pl. 927 (1753).

Kara Kova Dere, salt marsh, 30.7.23, *Ingoldby* 525.

Distr. VI. 1, 2, 2a, 3, 6a, 6b, 7, 14.

Echinops microcephalus *S. et S.* Prodr. ii. 209 (1813). *E. lanuginosus* S. et S. Fl. Gr. x. 18, t. 925 (1840).

Near Gaba Tepe, close to the beach, in bud, 10.6.23, *Ingoldby* 316; Kilia and Angadere, common, *Ingoldby* 559.

Distr. X. 2, 3, 6, 6a, 6b, 7, 8, 8a, 8b, 10.

Erigeron canadensis *L.* Sp. Pl. 863 (1753).

Suvla, sand dunes, 5.8.23, *Ingoldby* 543.

Distr. I. 2, 2a, 3, 4, 4a, 5, 6a, 7, 8, 8a, 9, 10, 11, 12, 13, 14, 15, 16.

Filago germanica *L.* Sp. Pl. ed. 2, 1311 (1763) var. **eriocephala** *Boiss.* Fl. Or. iii. 245 (1875). *Filago eriocephala* Guss. Pl. Rar. 344, t. 59 (1826).

Near Angadere, in open oak scrub, 27.7.23, *Ingoldby* 477.

Distr. III. 1, 2, 2a, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 6b, 7, 7a, 8, 8a, 8b, 9, 10, 11, 12, 13, 14, 15, 16.

Hedypnois cretica *Willd.* Sp. Pl. iii. 1617 (1804), sensu Boiss. Fl. Or. iii. 719 (1875). *Hyoseris cretica* L. Sp. Pl. 810 (1753).

Kilia, common on dry hill-sides, in flower and fruit, 2–3.5.23, *Ingoldby* 134; Suvla, 24.4.24, *Durham* 43, the host of *Orobanche Mutelii* F. Sch.

Distr. V. 1, 2, 2a, 3, 4, 4a, 5, 6a, 7, 8a, 11, 14, 16.

The plants collected by Ingoldby are more hairy than often in this species and agree closely with the description of *Hedypnois crepidiformis* Reichb. Fl. Germ. Excurs. 250 (1830–32). *H. cretica* (L.) Willd. sensu Boiss. is a polymorphic species, in that various combinations of characters are found in different individuals.

Helichrysum siculum *Boiss.* Fl. Or. iii. 229 (1875). *Gnaphalium siculum* Spreng. Syst. iii. 476 (1826).

Kilia, common on steep dry hillsides and cliff faces, 4.5.23, *Ingoldby* 153.

Distr. X. 1, 2, 2a, 4a.

Hieracium Bauhinii *Schult.* Obs. Bot. 164 (1809).

Helles, 27–28.5.23, *Ingoldby* 253.

Distr. X. and XII. 2, 3, 3b, 4, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10, 11, 12, 13, 14, 15, 16.

Inula germanica *L.* Sp. Pl. 883 (1753).
Angadere, 22–24.7.23, *Ingoldby* 439.
Distr. X. and XII. 3, 3a, 3b, 4, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10, 11, 12.

Jurinea consanguinea *DC.* Prodr. vi. 676 (1837). *J. anatolica* Boiss. Diagn. Ser. I. iv. 21 (1844) var. *consanguinea* Boiss. Fl. Or. iii. 574 (1875).

Helles, common, 28.5.23, *Ingoldby* 264 ; Suvla and Anzac, 25.5.24, *Kett* 108.
Distr. X. 2a, 7, 8b.

The oldest name for this species is *J. consanguinea*, but its subdivision into varieties is not yet satisfactorily accomplished. The indumentum and degree of asperity of the leaves, the branching or simplicity of the inflorescence, the length and squarrosity of the phyllaries, yield characters which appear in various combinations.

The specimens from the Gallipoli Peninsula are remarkable for the green, not white-tomentose, very asperous upper surfaces of the leaves, which are divided into relatively narrow segments. Other specimens at Kew with asperous upper surfaces to the leaves are from : Ile de Metelin (Mytilene), *Aucher-Eloy*, Dardanelles, *Calvert and Zohrab*, Kalymnos, *Forsyth Major*, Dardanelles, *Sintenis*, Chios, *Aucher-Eloy*.

Lactuca viminea *Presl* Fl. Čech. 160 (1819). *Prenanthes viminea* L. Sp. Pl. 797 (1753).
Angadere, 22–24.7.23, *Ingoldby* 438.
Distr. VI. and XII. 1, 2, 3, 3a, 3b, 4, 5, 6, 7, 8, 8a, 8b, 9, 10, 11, 12, 13, 14, 15, 16.

Leontodon tuberosus *L.* Sp. Pl. 799 (1753).
Kilia, common, 2–3.5.23, *Ingoldby* 136a.
Distr. VI. 1, 2, 2a, 3b, 4a, 5, 6, 6a, 7, 11, 13, 14, 15, 16.

Matricaria chamomilla *L.* Sp. Pl. 891 (1753).
Kilia, common and abundant, covers acres, 12.5.23, *Ingoldby* 169 ; Suvla and Anzac, 16.5.24, *Kett* 133.
Distr. III. 1, 2, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 7, 8, 8a, 9, 10, 11, 12, 14, 15, 16.

Pallenis spinosa *Cass.* Dict. Sci. Nat. xxxvii. 276 (1825). *Buphthalmum spinosum* L. Sp. Pl. 903 (1753).
Kilia, common, 24.5.23, *Ingoldby* 222.
Distr. IV. and V. 1, 2, 2a, 3, 4, 4a, 5, 6, 6a, 7, 7a, 11, 13, 14, 15, 16.

Pterotheca bifida *Fisch. et Mey.* Ind. Hort. Petrop. n. 1736 (1837).
Helles, common, 23–24.4.23, *Ingoldby* 68 ; Kilia, 2–4.5.23, *Ingoldby* 136, 144 ; Suvla and Anzac, 16.5.24, *Kett* 132.
Distr. X. 1, 2, 3b, 4a, 6, 6a, 7, 8, 8a, 8b, 9, 10, 11, 12, 13, 14, 16.

Scolymus hispanicus *L.* Sp. Pl. 813 (1753).
Suvla beach, 8.6.23, *Ingoldby* 292a.
Distr. VI. 1, 2, 2a, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 7, 7a, 8, 8a, 8b, 9, 11, 13, 14, 15, 16.

Scorzonera laciniata *L.* Sp. Pl. 791 (1753). *Podospermum laciniatum* DC. in Lamk. et DC. Fl. Fr. ed. 3, iv. 62 (1805).
Kilia, 2–3.5.23, *Ingoldby* 131.
Distr. V. and XII. 6, 6a, 7, 8, 8a, 8b, 9, 10, 11, 14, 15, 16.

S. lanata *M.B.* Fl. Taur. Cauc. ii. 237 (1808). *Leontodon lanatum* L. Amoen. iv. 287 (1759).
Kilia, common and abundant, 19–22.4.23, *Ingoldby* 43; Suvla and Anzac, 16.5.24, *Kett* 144.
Distr. XI. 2, 6a, 7, 8a.

Sonchus Nymanii *Tin. et Guss.* Syn. ii. 860 (1844). *S. glaucescens* Jord. Obs. v. 75, t. 5 (1847).
Kilia, common and said to be eaten by the Turks, 2–3.5.23, *Ingoldby* 129, determination not certain owing to the material being incomplete; between Songaule Dere and Jam Baz Dere, 8–11.5.23, *Ingoldby* 190.
Distr. XI. 1, 2, 2a, 3, 3b, 4a, 5, 6, 6a, 7, 8, 8a, 14.

Taraxacum serotinum *Poir.* in Lamk. Encycl. Suppl. iv. 420 (1816).
Angadere, grassy clearing near the summit of Hill 1011, 29.7.23, *Ingoldby* 492.
Distr. X. and XIVa. 6a, 8, 8a, 8b, 9, 10.

Tragopogon glaber *Hoffm.* in Engl. u. Prantl Pflanzenfam. iv. 5, 365 (1892). *Geropogon glaber* L. Sp. Pl. ed. 2, 1109 (1762).
Kilia, pale mauve flowers, 24.4.24, *Durham* 107.
Distr. V. 1, 2, 4a, 6a, 7, 12, 14.

T. porrifolius *L.* Sp. Pl. 789 (1753).
Helles, in fruit, 6.5.23, *Kett* 4; Angadere, in open oak scrub 27.7.23, *Ingoldby* 486; Suvla and Anzac, 16.5.24, *Kett* 92.
Distr. VI. 1, 2, 2a, 3, 3b, 4, 4a, 6, 6a, 7, 8a, 13, 14, 16.

Xanthium spinosum *L.* Sp. Pl. 987 (1753).
Anzac, near the beach, August 1923, *Ingoldby* 560.
Distr. I. 1, 2, 2a, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 7, 7a, 8, 8a, 8b, 9, 10, 10a, 11, 12, 13, 14, 15, 16.

Xeranthemum foetidum *Moench.* Meth. 582 (1794). *X. cylindraceum* S. et S. Prodr. Fl. Gr. ii. 172 (1813).
Angadere, 24.7.23, *Ingoldby* 465.
Distr. VI. XIII. and XIVa. 2, 3, 3a, 3b, 4, 5, 6, 6a, 8, 8a, 8 9, 10, 11, 12, 13, 15, 16.

CAMPANULACEAE.

Asyneuma parviflora *Turrill* sp. nov.: ab *A. otites* (Boiss.) Bornm. in Beih. Bot. Centrlbl. xxxviii. 1921. 2, 347, floribus fructibusque minoribus receptaculo (ovario) omnino laeve epapilloso distinguitur.

Herba erecta. *Radix* crassa. *Caules* teretes, minute asperulo-puberuli deinde glabrescentes. *Foliorum* basilium laminae anguste oblanceolatae vel angustissime oblanceolato-lineares, apice acutiusculae, basi in petiolum gradatim angustatae, usque ad 4 cm. longae et 7 mm. latae, margine fere integrae vel inconspicue dentatae minute asperulo-ciliatae, fere glabrescentes; petioli usque ad 4·5 cm. longi; folia caulina superne gradatim in bracteas transientia. *Inflorescentia* 1·5–7 cm. longa, multiflora; bracteae lineares, 2–3 mm. longae. *Sepala* uninervia, oblongo-lanceolata, 1·75 mm. longa, 0·75 mm. lata, acuta. *Corolla* circiter 5 mm. longa, lobis lineari-lanceolatis acutis. *Stylus* 5 mm. longus, apice in stigmatibus brevibus divisus, superne minutissime puberulus. *Receptaculum* (ovarium) breviter obconicum, 1 mm. altum, 1 mm. diametro, glabrum, longitudinaliter costatum. *Capsula* vix 4 mm. alta, 2 mm. dimeatro, omnino glabra, nitens, longitudinaliter valde costata. *Semina* late compresso-ellipsoidea, fere 1 mm. longa et 0·7 mm. lata, laevissima, nitentia.

Angadere, 1.7.23, *Ingoldby* 359,360; Angadere, 15.7.23, *Ingoldby* 365; Biyick Yakajik Tepe, 21.7.23, *Ingoldby* 426,427.

Asyneuma otites was originally described, as *Podanthum otites*, by Boissier [Fl. Or. iii. 952 (1875)] from specimens collected by Balansa "ad radices Tauri Cilicici circum pagum Gulek Boghas", and by Nordmann "Transcaucasia ad fines Turcicas." Prof. Chodat kindly loaned to Kew the sheet of two specimens, one flowering, one fruiting, collected by Balansa and used by Boissier in drawing up his description. It was evident that the Gallipoli plants represented a different, though closely related species. Boissier refers somewhat doubtfully (l.c. 953) to *P. otites* a flowering specimen collected by Wiedemann "ex Sojut et monte Kischichdagh Anatoliae bor." The sheet of Wiedemann's from this locality at Kew is, like that seen by Boissier, in flower and very young fruit. I do not feel quite certain about it, but I am inclined to consider it *Asyneuma parviflora* and not *A. otites*. The receptacle (ovary) is glabrous in a very young fruit which is present, and not provided with minute papillae.

A sheet of specimens, collected by P. Sintenis, Iter trojanum, No. 1144, 10.7.1883, and determined by P. Ascherson as *Podanthum otites* Boiss ?, is preserved at Kew and is certainly *Asyneuma parviflora*. The locality given is simply "Dardanelli: in montosis" and I have been unable to discover whether the specimens were collected in Europe or in Asia.

The measurements in the above diagnosis were taken from

Ingoldby's specimens, of which 359 may be considered the nomenclatural standard or "type." *Sintenis* 1144 is more luxuriant in all its parts. The leaves measure up to 2.3 dm. in length, including the petiole. The inflorescence is branched in the lower part and is 4.5 dm. long.

Campanula lyrata *Lamk.* Encycl. i. 588 (1784).

Jam Baz Dere, common in thick scrub-gullies and on shady hillsides, 8.5.23, *Ingoldby* 156; Helles, 14.5.23, *Kett* 12. *Distr.* X. 7.

Campanula macrostachya *Kit.* apud Willd. Enum. Hort. Berol. i. 213 (1809). *C. multiflora* W. et K. Pl. Rar. Hung. iii. 292, t. 263 (1812), vide Kit. Addit. in Linnaea xxxii. 429 (1863).

Angadere, 22–24.7.23, *Ingoldby* 433.
Distr. XIX. 6a, 7, 8, 8a, 8b, 9, 10, 11.

Legousia pentagonia *Thell.* in Vierteljahr. Naturf. Ges. Zurich lii. 465 (1907). *Campanula pentagonia* L. Sp. Pl. 169 (1753).

Kilia, common and abundant, occasionally in large carpets, 12.5.23, *Ingoldby* 168; Walker's Ridge, Anzac, 90 m., in flower 16.5.23, *Kett* 28; Suvla and Anzac, 16.5.24, *Kett* 119.
Distr. X. 1, 2a, 4a, 7.

The specimens under the last number are all depauperated, probably owing to the dryness of the habitat, and show a considerable range in the density of the indumentum. Two of the specimens with a close dense pubescence approach the *Specularia Speculum* var. *stricta* of Griseb. Spic. Fl. Rumel. ii. 279 (1844), which, in my opinion, should come under *Legousia pentagonia*.

ERICACEAE.

Arbutus andrachne *L.* Sp. Pl. ed. 2, 566 (1762).

Between Sogaule Dere and Jam Baz Dere, 8–11.5.23, *Ingoldby* 177.
Distr. X. and to Crimea. 1, 2, 2a, 3, 3a, 4, 6b, 7, 8b.

Arbutus unedo *L.* Sp. Pl. 395 (1753).

Anzac and Suan Dere, common, Nov. 1922, *Kett* 85, the specimen representing a narrow-leaved plant; Angadere, in young fruit, 22–24.7.23, *Ingoldby* 442; Angadere, near Biyick Yakajik Tepe, in young fruit, Aug. 1923, *Ingoldby* 558.
Distr. VI. 1, 2, 2a, 3, 3a, 3b, 4, 4a, 5, 7, 7a, 13, 14, 15, 16.

Erica verticillata *Forsk.* Fl. Aegypt.-Arab. 210 (1775).

Anzac and Helles, common, 2–3 feet in height, in flower Nov. 1922, *Kett* 81; Kilia, 18.7.23, *Ingoldby* 453.
Distr. X. 1, 2, 2a, 3, 3a, 3b, 4, 4a, 5, 6a, 6b, 7, 13, 14.

PLUMBAGINACEAE.

Goniolimon collinum *Boiss.* Fl. Or. iv. 855 (1879). *Statice collina* Griseb. Spic. Fl. Rumel. ii. 300 (1844).

Maidos, cliff face, 18.5.23, *Ingoldby* 212; Anzac beach, May 1923, *Ingoldby* 212a; Anzac, in flower, 22.5.23, *Kett* 38; Gaba Tepe, close to the beach, 10.6.23, *Ingoldby* 323.

Distr. X. 6, 6a, 7, 8, 8a, 8b, 10.

Limonium vulgare *Mill.* Gard. Dict. ed. 8 (1768) var. **macrocladon** Salmon in Journ. Bot. xliii. 13 (1905). *Statice limonium* L. Sp. Pl. 274 (1753) var. *macroclada* Boiss. in DC. Prodr. xii. 645 (1848).

Near Anzac, middle of August 1923, *Ingoldby* 587.

Distr. (of var.) X. Probably the commonest variety in the B. P., where the species occurs in: 1, 2, 2a, 3, 4, 5, 6, 6a, 7, 9, 13, 14, 15, 16.

Limonium virgatum *Fourr.* in Ann. Soc. Linn. Lyon, N. S. xvii. 141 (1869) non vidi. *Statice virgata* Willd. Enum. Hort. Berol. i. 336 (1809).

Kara Kova Dere, in salt-marsh, 30.7.23, *Ingoldby* 519.

Distr. VI. 1, 2, 2a, 5, 6a, 7, 14.

PRIMULACEAE.

Anagallis arvensis *L.* Sp. Pl. 148 (1753).

Helles, common, 23–24.4.23, *Ingoldby* 83; Suvla, 24.4.24, *Durham* 64a.

Distr. I. 1, 2, 2a, 3, 3a, 3b, 4, 4a, 5, 6a, 7, 8, 8a, 9, 10, 10a, 11, 12, 13, 14, 15, 16.

A. arvensis *L.* var. **carnea** *Schrank* ex Druce List Brit. Pl. 48 (1908). *A. carnea* Schrank, Baier. Fl. i. 461 (1789). *A. amoena* Heldr. Herb. Norm. 1174 et Hal. Consp. Fl. Gr. iii. 11 (1904).

Suvla, 24.4.24, *Durham* 64b.

Distr. (of var.). Here and there over the distributional area of the species, but much rarer than other varieties.

A hybrid origin for this is suggested by Pax and Knuth in Engler, Pflanzenr. iv. 237, 324 (1905) and by Halácsy, l.c. It is doubtful if this can be proved, as indicated in the Kew Bulletin 1918, 321, and Journal of Botany xlix. 44 seq. (1911).

A. foemina *Mill.* Gard. Dict. ed. 8 (1768). *A. caerulea* Schreb. Spic. Lips. 5 (1771).

Kilia, common and abundant, 23–24.4.23, *Ingoldby* 44; Suvla, 24.4.24, *Durham* 64c.

Distr. I. 1, 2, 2a, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 7, 7a, 8, 8a, 8b, 9, 10, 10a, 11, 12, 13, 14, 15, 16.

Lysimachia dubia *Soland.* in Ait. Hort. Kew i. 199 (1789).
Boghali, growing in a shady gorge by a fountain, 24.7.23, *Ingoldby* 473.
Distr. XI. 2, 3b, 5, 6, 6a, 8a.

STYRACEAE.

Styrax officinalis *L.* Sp. Pl. 444 (1753).
Boghali, a shrub 4 to 5 feet in height with white flowers in early spring, fruit collected in Oct. 1922, *Kett* 69; Boghali, 17.5.23, *Ingoldby* 199; Kilia, in bud, 24.4.24, *Durham* 104; Suvla and Anzac, in flower, 16.5.24, *Kett* 145.
Distr. VI. 1, 2, 2a, 7, 14.

OLEACEAE.

Jasminum fruticans *L.* Sp. Pl. 7 (1753).
Kilia, yellow flowers, 24.4.24, *Durham* 106.
Distr. V. 2, 3, 3a, 3b, 4, 5, 6, 6a, 7, 8, 8a, 8b, 9, 15.

Olea europaea *L.* Sp. Pl. 8 (1753).
Eski Keui, 3.6.23, *Ingoldby* 286.
Distr. V. 1, 2, 2a, 3, 4, 5, 6, 7, 7a, 11, 13, 14, 15, 16.

Phillyrea media *L.* Syst. ed. 10, 847 (1759).
Walker's Ridge, Anzac, 90 m., 1 to 4 feet in height, *Kett* 3; Anzac, an evergreen shrub, Nov. 1922, *Kett* 80; Angadere, in fruit end of July 1923, *Ingoldby* 578.
Distr. VI. 1, 2, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 7, 8a, 11, 14, 15, 16.

ASCLEPIADACEAE.

Cynanchum acutum *L.* Sp. Pl. 212 (1753).
Maidos, 14.6.23, *Ingoldby* 331; Angadere, 15.7.23, *Ingoldby* 383; Suvla, on sand dunes between the salt-marsh and the beach, 5.8.23, *Ingoldby* 546.
Distr. III. 2, 2a, 3, 3a, 4, 4a, 5, 6, 6a, 7, 8, 8a, 9, 14, 15, 16.

No. 331 represents a plant with relatively large, broad leaves; the corona lobes are well developed, long and acuminate; the stamens are short, excluding the terminal appendage, 0.75 mm. long. Nos. 383 and 546 are from plants with relatively smaller and narrower leaves; the corona lobes are shorter; the stamens excluding the terminal appendage, are 1.25 mm. long.

Marsdenia erecta *R. Br.* Mem. Wern. i. 29 (1811). *Cynanchum erectum* L. Sp. Pl. 213 (1753).
Suan Dere, near a waterfall, 5 to 6 feet in height, in fruit, Nov. 1922, *Kett* 83; Helles, 28.5.23, *Ingoldby* 250; Suvla, 8.6.23, *Ingoldby* 294a.
Distr. X. and XI. 1, 2, 2a, 3, 5, 6, 6a, 7, 8a, 8b, 11.

Capt. Ingoldby informs me that this species, as it grows in Gallipoli Peninsula, is only erect when in quite small plants. When growing as fair-sized bushes, generally on the banks of narrow, steep shady gullies, it tends to trail.

Periploca graeca *L.* Sp. Pl. 211 (1753).

Boghali, in fruit, 8.7.23, *Ingoldby* 411; Angadere, ripe seed-pod, 4.4.23, *Ingoldby* 417.

Distr. X. and XI. 1, 2, 4a, 5, 6a, 6b, 7, 8, 9, 11, 14, 15.

APOCYNACEAE.

Apocynum venetum *L.* Sp. Pl. 213 (1753).

Near Gaba Tepe, rare and local, at the foot of a steepish sandy cliff, 10.6.23, *Ingoldby* 304.

Distr. III. 7, 9, 16.

The flowers fade blue and have a sweet smell.

GENTIANACEAE.

Blackstonia perfoliata *Huds.* Fl. Angl. ed. 1, 146 (1762).

Angadere, 18.7.23, *Ingoldby* 471.

Distr. IV. and VI. 1, 2, 2a, 4a, 5, 6, 6a, 7, 8, 10, 11, 13, 14, 15, 16.

Capt. Ingoldby's plants have small flowers and very short calyx segments. A careful examination of all the material of the genus at Kew has convinced me that they must be considered as extreme examples of the widespread species, which shows a considerable range in the shape and size of its parts, without doubt due largely to fluctuation according to the nature of the habitat. It is, however, probable that uncorrelated germinal mutations occur but are reabsorbed into the species, since there is no evidence that they persist in an isolated condition sufficiently long to establish a distinct entity. Floral dimorphism is shown in the specimens collected by Capt. Ingoldby. Flowers dissected from one specimen showed either long anthers linear in outline or short ones narrowly ovate in outline.

Centaurium maritimum *Fritsch* in Mitt. Naturwiss. Ver. Wien, v. 97 (1907), non vidi. *Gentiana maritima* L. Mant. prima i. 55 (1767). *Erythraea maritima* Pers. Syn. i. 283 (1805).

Suvla, 27–28.5.23, *Ingoldby* 242.

Distr. VIII. and Western Europe. 1, 2, 4a, 5, 6b, 7, 11, 14, 15, 16.

C. pulchellum *Druce* in Ann. Scot. Nat. Hist. 1907, 242. *Gentiana pulchella* Sw. in Vet. Acad. Handl. 1783, 85, t. 3. *Erythraea pulchella* Fr. Nov. Fl. Suec. ed. 1, 30, non vidi, ed. 2, 74 (1828).

Kilia, 16.5.23, *Ingoldby* 198; Helles, in flower, 24.5.23, *Kett* 47; Angadere, 21.7.23, *Ingoldby* 420.

Distr. IV. 1, 2, 2a, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10, 11, 12, 13, 14, 15, 16.

C. spicatum *Fritsch* in Mitt. Naturwiss. Ver. Wien. v. 97 (1907), non vidi. *Gentiana spicata* L. Sp. Pl. 230 (1753). *Erythraea spicata* Pers. Syn. i. 283 (1805).

Kara Kova Dere, salt marsh, 30.7.23, *Ingoldby* 518; Suvla, sand dunes, 5.8.23, *Ingoldby* 545.

Distr. VI. 1, 2, 2a, 3, 4, 4a, 5, 6, 6a, 7, 8a, 9, 11, 14, 16.

C. subspicatum *Ronn.* in Fritsch Neue Beitr. Fl. Balkan-Halbinsel in Mitt. Naturwiss. Ver. f. Steiermark, lii. 321 (1915). *Erythraea subspicata* Vel. in Sitz. Böhm. Ges. Wiss. 1889. ii. 37 (1890) et Fl. Bulg. 385 (1891).

Soganledere, in flower, 10.7.23, *Ingoldby* 416; Angadere, 24.7.23, *Ingoldby* 470.

Distr. XX. 8.

The specimens have been determined from the description in the Flora Bulgarica. The essential characters given agree well with those shown in Ingoldby's specimens, except that the lower leaves are rounded at the apex.

C. tenuiflorum *Fritsch* in Mitt. Naturwiss. Ver. Wien, v. 97 (1907), non vidi. *Erythraea tenuiflora* Hoffm. et Link, Fl. Port. i. 354, t. 67 (1809).

Suvla, sand dunes, common, in pink and white varieties, 8.6.23, *Ingoldby* 299, 300; near Gaba Tepe, close to the beach, 10.6.23, *Ingoldby* 320; Angadere, 1.7.23, *Ingoldby* 343.

Distr. VIII. 1, 2, 3, 4, 4a, 5, 6a, 6b, 7, 11, 14, 16.

C. umbellatum *Gilib.* Fl. Lithuan. i. 35 (1785), non vidi. *Gentiana centaurium* L. Sp. Pl. 229 (1753). *Erythraea centaurium* Pers. Syn. i. 283 (1805).

Kilia, 3.6.23, *Ingoldby* 278; Angadere, 1.7.23, *Ingoldby* 344.

Distr. IV. and V. 1, 2, 2a, 3, 4, 5, 6, 6a, 8, 8a, 9, 10, 11, 12, 13, 14, 15, 16.

C. sp.

Maidos, 15.6.23, *Ingoldby* 340.

This has not been matched, but the material is unfortunately insufficient for a good description. The corolla-tubes are remarkably short, relative to the large lobes and much exserted stamens.

CONVOLVULACEAE.

Convolvulus elegantissimus *Mill.* Gard. Dict. ed. 8 (1768). *C. tenuissimus* S. et S. Prodr. i. 134 (1806) et Fl. Gr. ii. t. 195 (1813).

Boghali, common on all dry open hill-sides, 29.4.23, *Ingoldby* 127; Jam Baz, 8.5.23, *Ingoldby* 164; Walker's Ridge, Anzac, 90 m., 16.5.23, *Kett* 23; Angadere, 1.7.23, *Ingoldby* 351; Kara Kova Dere, on steep sandy quarry face, 30.7.23, *Ingoldby* 513; Suvla, 24.4.24, *Durham* 29; Suvla and Anzac, 16.5.24, *Kett* 122.

Distr. VI. 1, 2, 2a, 3, 4, 4a, 5, 6, 6a, 6b, 7, 7a, 11, 13, 14, 15, 16.

C. hirsutus *Stev.* in M. B. Fl. Taur.-Cauc. i. 422 (1808).

Anzac, 27–28.5.23, *Ingoldby* 246.

Distr. XI. 1, 2, 3, 4a, 6a, 6b, 7, 8a, 8b, 10.

C. pilosellaefolius *Desr.* in Lamk. Encycl. iii. 551 (1791).

Angadere, at the head of the valley, overlooking Karnabile, in flower, 22–24.7.23, *Ingoldby* 431.

The leaves are somewhat narrower than in most plants of this species, but the distinctive calyces are quite typically developed.
Distr. XI.

BORRAGINACEAE.

Alkanna tinctoria *Tausch* in Flora 1824, i. 234. *Lithospermum tinctorium* L. Sp. Pl. 132 (1753).

Kilia, common on dry hillsides, late March, *Ingoldby* 9a; between Sogaule Dere and Jam Baz Dere, 8–11.5.23, *Ingoldby* 176; Kara Kova Dere, 30.7.23, *Ingoldby* 514.
Distr. VI. 1, 2, 2a, 3, 4a, 5, 6, 6a, 7, 7a, 8a, 11, 13.

Anchusa hybrida *Ten.* Fl. Nap. i. 45, t. 11. (1811–1815).

Kilia, 19–22.4.23, *Ingoldby* 51; Angadere, 15.7.23, *Ingoldby* 368; Angadere, near the stream, 21.7.23, *Ingoldby* 418; a grassy clearing on the summit, 29.7.23, *Ingoldby* 490; Ibrahim Keir, 30.7.23, *Ingoldby* 530; Western Peninsula, an erect branching plant with royal purple flowers, 24.4.24, *Durham* 79.
Distr. VI. but not west of Corsica and Sardinia. 1, 2, 2a, 3, 4, 4a, 5, 6a, 7, 8, 8a, 8b, 10, 11.

A. italica *Retz.* Obs. i. 12 (1779).

Kilia, common and abundant, 24.5.23, *Ingoldby* 231; Maidos, 14.7.23, *Ingoldby* 380; Kilia, deep gentian blue, 24.4.24, *Durham* 11.
Distr. V. 1, 2, 3, 3b, 4, 5, 6, 6a, 7, 8, 8a, 9, 10, 11, 12, 13, 14, 15, 16.

A. officinalis *L.* Sp. Pl. 133 (1753). ?

Anzac, 27.5.23, *Ingoldby* 254.
Distr. IV. and V. 2, 3, 3a, 3b, 4, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10, 10a, 11, 12, 13, 15, 16.

The material is insufficient for me to be certain of this determination.

Borrago officinalis *L.* Sp. Pl. 137 (1753).

Helles, rare, growing in a shell-hole on the flat ground above the gully, 23–24.4.23, *Ingoldby* 69.
Distr. VI. and XII. 1, 2, 2a, 6a, 7, 9, 14, 15, 16.

Cerinthe major *L.* Sp. Pl. 136 (1753).

Helles, among thick low vegetation, in a ravine, 23–24.4.23, *Ingoldby* 74; Anzac, May 1923, *Kett* 34.
Distr. V. and XII. 1, 2, 2a, 4a, 5, 6a, 7, 14, 15.

Cerinthe minor *L.* Sp. Pl. 137 (1753) var. **hispida** *Turrill* var. nov., pedicellis hispidis.

Angadere, 22–24.7.23, *Ingoldby* 450.
Distr. (of species) V. and XII. 1, 2, 3a, 3b, 4, 5, 6a, 8, 8a, 8b, 9, 10, 11, 12, 13, 14, 15, 16.

The widely distributed species, *C. minor*, shows, as might be expected, a considerable range of expression of certain characters.

The presence or absence of hairs on the pedicels has not, so far as I have found, hitherto been commented upon by systematists. The specimens collected by Capt. Ingoldby have the pedicels markedly hispid, with stiff spreading white hairs. An examination of the rich material of this species at Kew indicates that plants showing this character have a certain geographical distribution. The greater number of specimens from the eastern part of the Mediterranean Region, from Asia Minor, Armenia, Kurdistan, and Syria, have hispid pedicels. In the Caucasus, plants with hispid pedicels and plants with glabrous pedicels occur. From the western side of the Balkan Peninsula specimens have been received with glabrous pedicels from Serbia, near Nish; Herzegovina, near Mostar; Dalmatia, near Cattaro; and from the Trieste district, Lippiza wood. Plants with hispid pedicels were collected in Macedonia, near Veles; Bulgaria, near Sliven; Dobruja, near Malkodz. From Greece, the specimens named *C. cleiostoma* Boiss. et Sprun. have glabrous pedicels, those named *C. macrophylla* Boiss. et Heldr. have the pedicels slightly hispid to glabrous. All the Kew specimens from the central and western parts of the Mediterranean Region and from Central Europe have glabrous pedicels. The geographical separation of the two variants is not complete for, in addition to both occurring in Greece and the Caucasus, a specimen from Mt. Ida, S. Troad, and specimens from Asia Minor, *Aucher* 2346, not exactly localized but the original number of var. ? *ciliaris* DC. Prodr. x. 3 (1846), have glabrous pedicels.

Cynoglossum creticum *Mill.* Gard. Dict. ed. 8 (1768). *C. pictum* Ait. Hort. Kew. i. 179 (1789).

Helles, 28.5.23, *Ingoldby* 271; Suvla, pale blue-veined flowers, 24.4.24, *Durham* 47.
Distr. V. 1, 2, 2a, 3, 4, 4a, 5, 6, 6a, 7, 8, 8a, 10, 11, 12, 13, 14, 15, 16.

Echium elegans *Lehm.* Pl. Asper. 459 (1818).

Angadere, in a shady valley, flowers pale blue, 22–24.7.23, *Ingoldby* 447.
Distr. X. 1, 2, 2a.

E. italicum *L.* Sp. Pl. 139 (1753).

Kilia, common and abundant, growing to a height of 3 feet 6 ins. or more, 24.5.23, *Ingoldby* 229.
Distr. V. 1, 2, 2a, 3, 4a, 5, 6, 6a, 7, 7a, 8, 8a, 9, 10, 11, 12, 13, 14, 15, 16.

E. plantagineum *L.* Mantissa altera 202 (1771).

Between Sogaule Dere and Jam Baz Dere, common and abundant, 8–11.5.23, *Ingoldby* 174, 188; Kilia, 24.4.24, purple flowers, *Durham* 95.
Distr. VI. 1, 2, 2a, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 6b, 7, 8, 8a, 14.

Heliotropium dolosum *De Not.* Rep. Fl. Lig. 318 (1846).
Kilia, Aug. 1923, *Ingoldby* 582.
Distr. III. 2, 2a, 3, 3a, 6a, 8a.

Lithospermum apulum *Vahl.* Symb. ii. 33 (1791). *Myosotis apula* L. Sp. Pl. 131 (1753).
Suvla, small yellow flowers, 24.4.24, *Durham* 56.
Distr. V. 1, 2, 2a, 6, 6a, 7, 8a, 10, 14, 16.

L. arvense *L.* Sp. Pl. 132 (1753).
Helles, 23–24.4.23, *Ingoldby* 94; Kilia, white flowers, 24–25.4.24, *Durham* 25, 116.
Distr. III. 1, 2, 2a, 3, 4, 4a, 6, 6a, 7, 8, 8a, 8b, 9, 10, 11, 12, 13, 14, 15, 16.

L. purpureo-coeruleum *L.* Sp. Pl. 132 (1753).
Angadere, local, in thick scrub, early April, *Ingoldby* 10; and in deep shade, 29.4.23, *Ingoldby* 120.
Distr. V. and XII. 2, 3, 3b, 4, 4a, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10, 11, 12, 13, 14, 15, 16.

Myosotis collina *Hoffm.* Deutschl. Fl. 61 (1791) non vidi, ed. nov. Pars. i. Sectio i. 85 (1800).
Anzac, 22.4.24, *Durham* 9.
Distr. V. and XII. 1, 2, 2a, 3, 3b, 4a, 5, 6, 6a, 7, 8, 8a, 8b, 10, 11, 12, 14, 15, 16.

M. idaea *Boiss. et Heldr.* Diagn. Ser. I. xi. 121 (1849).
Kilia, common, middle of March 1923, *Ingoldby* 11; Helles, 24.5.23, *Kett* 14.
Distr. X. 1, 2, 2a, 6, 6a, 6b, 7, 8, 8a, 11.

Onosma viride *Javorka* in Annal. Mus. Nat. Hung. iv. 433 (1906).
Between Sogaule Dere and Jam Baz Dere, in flower, 8–11.5.23, *Ingoldby* 178; Suvla and Anzac, 16.5.24, *Kett* 91.
Distr. XIX. 2, 3b, 5, 6a, 6b, 8, 8a, 8b, 10, 13, 14.

SOLANACEAE.

Hyoscyamus niger *L.* Sp. Pl. 179 (1753).
Kilia, 4 and 12.5.23, *Ingoldby* 137, 166.
Distr. III. 1, 2, 3, 3b, 4, 4a, 6, 6a, 7, 8, 8a, 9, 10, 10a, 11, 12, 13, 15, 16.

H. reticulatus *L.* Sp. Pl. ed. 2, 257 (1762).
Kilia, common, 23–24.4.23, *Ingoldby* 106.
Distr. XI.

Hal. Consp. Fl. Gr. ii. 364 (1902) states that though Linnaeus indicates this species from Crete it has not been found by recent collectors.

Lycium europaeum *L.* Sp. Pl. 192 (1753).
Helles, shrub 3 to 4 feet in height, flowers mauve, Nov. 1922, *Kett* 75.
Distr. V. 2, 3, 4, 4a, 5, 7, 14, 16.

Lycopersicum esculentum *Mill.* Gard. Dict. ed. 8 (1768).
Sestas, 7.7.23, *Ingoldby* 414.
Distr. Often found as an escape from cultivation.

Solanum dulcamara *L.* Sp. Pl. 185 (1753).
Boghali, in stream bed, 8.7.23, *Ingoldby* 401.
Distr. III. 2, 2a, 3, 4, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10, 11, 12, 13, 14, 15, 16.

S. nigrum *L.* Sp. Pl. 186 (1753).
Kilia, 11.8.23, *Ingoldby* 553.
Distr. I. 1, 2, 2a, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10, 11, 12, 13, 14, 15, 16.

SCROPHULARIACEAE.

Bellardia trixago *All.* Fl. Pedem. i. 61 (1785). *Bartsia trixago* L. Sp. Pl. 602 (1753).
Eski Keui, common, 13.5.23, *Ingoldby* 173; Helles, 14.5.23, *Kett* 59.
Distr. V. and S. Africa. 1, 2, 2a, 3, 4a, 5, 6, 6a, 6b, 7, 8a, 13, 14, 16.

Digitalis lanata *Ehrh.* Beitr. vii. 152 (1792).
Anzac, 20.5.23, *Kett* 22; Kilia, 22.5.23, *Ingoldby* 219.
Distr. XIX. 2, 3, 4, 6, 6a, 6b, 7, 7a, 8, 8a, 8b, 9, 10, 10a, 12.

Gratiola officinalis *L.* Sp. Pl. 17 (1753).
Angadere, 15.7.23, *Ingoldby* 367.
Distr. III. 2, 3, 3b, 4, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10, 11, 12, 13, 14, 15, 16.

Linaria genistifolia *Mill.* Gard. Dict. ed. 8 (1768). *Antirrhinum genistifolium* L. Sp. Pl. 616 (1753).
Anzac, in flower, 20.5.23, *Kett* 15.
Distr. III. 3, 3b, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10, 15.

L. pelisseriana *Mill.* Gard. Dict. ed. 8 (1768). *Antirrhinum pelisserianum* L. Sp. Pl. 615 (1753).
Helles, on open hillsides, 23.4.23, *Ingoldby* 61; Suvla, 24.4.24, *Durham* 3.
Distr. VI. 1, 2, 2a, 3, 3b, 4, 4a, 5, 6, 6a, 6b, 7, 8a, 8b, 10, 11, 13, 14, 16.

Parentucellia latifolia *Car.* in Parl. Fl. It. vi. 480 (1885).
Kilia, Aug. 1923, *Ingoldby* 582a.
Distr. V. 1, 2, 2a, 3, 3a, 4a, 5, 6, 6a, 6b, 7, 8, 8a, 10, 14, 16.

Scrophularia canina *L.* Sp. Pl. 621 (1753).
Anzac, 16.5.23, *Kett* 10 ; Helles, rare, a sub-shrub 2 feet in height, 28.5.23, *Ingoldby* 259.
Distr. IV. and VI. 1, 2, 2a, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 7, 8, 8a, 8b, 10, 11, 12, 13, 14, 15, 16.

Verbascum pinnatifidum *Vahl.* Symb. ii. 39 (1791).
Near Gaba Tepe, close to the beach, 10.6.23, *Ingoldby* 305 ; Kara Kova Dere, 31.7.23, *Ingoldby* 533.
Distr. X. 2, 2a, 3, 6b, 7.

V. sinuatum *L.* Sp. Pl. 178 (1753).
Angadere, 15.7.23, *Ingoldby* 366.
Distr. V. 1, 2, 2a, 3, 4, 4a, 5, 6, 6a, 7, 8, 8a, 8b, 11, 14, 16.

Veronica acinifolia *L.* Sp. Pl. ed. 2, 19 (1762).
Kilia, common, 19–22.4.23, *Ingoldby* 39.
Distr. XI. and XII. 1, 2, 3, 6b, 7, 8a, 10, 13, 14, 16.

V. anagallis *L.* Sp. Pl. 12 (1753).
Kara Kova Dere, 30 m., 30.7.23, *Ingoldby* 511.
Distr. I. 1, 2, 2a, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 7, 8, 8a, 8b, 10, 11, 12, 13, 14, 15, 16.

V. chamaepitys *Griseb.* Spic. Fl. Rumel. ii. 25 (1844).
Helles, common, 23–24.4.23, *Ingoldby* 80.
Distr. X. 7, 8a.

OROBANCHACEAE.

Orobanche minor *Sutton* in Trans. Linn. Soc. iv. 179 (1798).
Eski Keui, local, 18.5.23, *Ingoldby* 200.
Distr. II. 2, 2a, 4a, 6a, 7, 8, 8a, 8b, 10, 11, 14, 15, 16.

O. Mutelii *F. Schultz* in Mutel, Fl. Franç. ii. 353 (1835).
Suvla, 24.4.24, *Durham* 43. Parasitic on *Hedypnois cretica* Willd.
Distr. V., XIII. and XVIII. 1, 2, 2a, 4, 6a, 7, 8, 10, 11, 12, 13, 14, 16.

O. nana *Noë* ex Reut. in DC. Prodr. xi. 9 (1847).
Kilia, brilliant blue flowers, 24.4.24, *Durham* 73.
Distr. V. and XVIII. 2, 2a, 4, 4a, 6a, 7, 10, 11, 14, 15, 16.

VERBENACEAE.

Verbena officinalis *L.* Sp. Pl. 20 (1753).
Kara Kova Dere, 30 m., 30.7.23, *Ingoldby* 510.
Distr. I. 1, 2, 2a, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10, 10a, 11, 12, 13, 14, 15, 16.

Vitex agnus-castus *L.* Sp. Pl. 638 (1753).
Anzac, shrub 6 feet in height, flowers mauve and white, 18.10.22, *Kett* ; Kilia, 8.7.23, *Ingoldby* 405, 406.
Distr. V. 1, 2, 2a, 3, 4, 4a, 5, 6a, 6b, 7, 7a, 8b, 11, 13, 14, 15, 16.

LABIATAE.

Ajuga chamaepitys *Schreb.* Pl. Verticill. Unilab. 24 (1774).
Teucrium chamaepitys L. Sp. Pl. 562 (1753).

Helles, common, yellow flowers, Nov. 1922, *Kett* 76; Kilia, 19 22.4.23, *Ingoldby* 59; Suvla, 24.4.24, *Durham* 7.
Distr. V. and XII. 2, 2a, 3, 4, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10, 11, 12, 13, 14, 15, 16.

I confess to being able to draw no sharp line between *A. chamaepitys* (L.) Schreb. and *A. chia* (Poir.) Schreb. The former is, on the whole, West European and North African, the latter South-East European and Oriental. Both occur in the Balkan Peninsula and various kinds of intermediates are found. The specimens collected by Kett and Ingoldby have not the relatively large corollas of the typically Oriental *A. chia*, but very closely match western specimens of *A. chamaepitys*. On the other hand I cannot distinguish Durham's fine specimen from *A. chia* of the Orient, except that it appears to be annual.

Ballota nigra *L.* Sp. Pl. 582 (1753).
Angadere, 22–24.7.23, *Ingoldby* 449.
Distr. IV. and V. 1, 2, 2a, 3, 3a, 3b, 4, 4a, 5, 6a, 8, 8a, 9, 10, 10a, 11, 12, 13, 14, 15, 16.

Calamintha vulgaris *Druce* in Ann. Scot. Nat. Hist. 1906, 224. *Clinopodium vulgare* L. Sp. Pl. 587 (1753).
Angadere, in open oak scrub, 22–28.7.23, depauperated plants, *Ingoldby* 435, 489.
Distr. III. 1, 2, 3, 4, 4a, 5, 6, 6a, 7, 7a, 8, 8a, 8b, 9, 10, 11, 12, 13, 14, 15, 16.

Coridothymus capitatus *Reichb. fil.* in Oestr. Bot. Wochenbl. vii. 161 (1857). *Satureia capitata* L. Sp. Pl. 568 (1753).
Common at Anzac, Suvla, and Helles, 1 foot high, flowers mauve, Nov. 1922, *Kett* 77; Kilia, a beautiful shrub, common and abundant on all open hillsides where *Cistus* grew, 8.7.23, *Ingoldby* 399.
Distr. VI. 1, 2, 2a, 3, 4a, 5, 7, 7a, 14, 15.

Lamium amplexicaule *L.* Sp. Pl. 579 (1753).
Helles, open hillsides, 23.4.23, *Ingoldby* 63; Suvla, pink flowers, 24.4.24, *Durham* 38.
Distr. III. 2, 2a, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 7, 8, 8a, 9, 10, 11, 12, 13, 14, 15, 16.

Lavandula stoechas *L.* Sp. Pl. 573 (1753).
Helles, local, 23–24.4.23, *Ingoldby* 95; Suvla, 16.5.24, *Kett* 124.
Distr. VI. 1, 2, 2a, 4a, 7.

Marrubium peregrinum *L.* Sp. Pl. 582 (1753).
Kilia, 8.7.23, *Ingoldby* 398.
Distr. XII. and XIVa. 1, 2, 3, 3b, 4, 6, 6a, 7, 8, 8a, 9, 10, 15.

Mentha microphylla *C. Koch* in Linnaea xxi. 650 (1848).
Kilia, 8.7.23, *Ingoldby* 403.
Distr. XI. and west to Italy. 1, 2, 3, 6, 6a, 7, 7a, 8, 8a, 11.

Micromeria graeca *Benth.* Lab. 373 (1834). *Satureia graeca* L. Sp. Pl. 568 (1753), var. **villicaulis** *Borb.* ap. Formanek in

Ver. Brünn. 1895. 35. non vidi; Hal., Consp. Fl. Gr. ii. 549 (1902); Vandas, Reliq. Formanek. 483 (1909).

Boghali, 8.7.23, *Ingoldby* 389; Angadere, in the valley, 29.7.23, *Ingoldby* 496.

Distr. (of var.) XX. 1, 2, 4a.

Origanum hirtum *Link*, Enum. Hort. Berol. ii. 114 (1822).

Angadere, 22–24.7.23, *Ingoldby* 452.

Distr. X. 1, 2, 2a, 3, 3a, 3b, 4, 4a, 5, 6a, 6b, 7a, 8, 14, 16.

Phlomis pungens *Willd.* Sp. Pl. iii. 121 (1801) var. **laxiflora** *Vel.* Fl. Bulg. Suppl. 232 (1898) as subsp.; Fl. Bulg. 459 (1891).

Eski Keui, 3.6.23, *Ingoldby* 285.

Distr. (of species) III. 2, 3, 6, 6a, 7, 8a, 9, 10.

Prunella laciniata *L.* Sp. Pl. ed. 2. 837 (1763).

Angadere, in open oak scrub, 27.7.23, *Ingoldby* 483, 487.

Distr. V. and XII. 1, 2, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16.

P. vulgaris *L.* Sp. Pl. 600 (1753).

Angadere, 24.7.23, *Ingoldby* 469.

Distr. I. 1, 2, 3, 3b, 4, 4a, 5, 6, 6a, 7, 8, 9, 10, 10a, 11, 12, 13, 14, 15, 16.

P. laciniata *L.* x **vulgaris** *L.* ?

Angadere, corollas blue fading to purple, 22–24.7.23, *Ingoldby* 436.

Salvia aethiopis *L.* Sp. Pl. 27 (1753).

Anzac, 27–28.5.23, *Ingoldby* 247; Angadere, 22–24.7.23, *Ingoldby* 446.

Distr. V. 6, 7, 8, 8a, 8b, 9, 10.

S. verbenaca *L.* Sp. Pl. 25 (1753).

Suvla, clear blue flowers, 24.4.24, *Durham* 49.

Distr. V. and W. Europe. 1, 2, 2a, 3, 3a, 3b, 4, 4a, 5, 6a, 7, 8, 8a, 13, 14, 15, 16.

S. verbenaca *L.* var. **vernalis** *Boiss.* Voy. Bot. Esp. ii. 484 (1839–1845). *S. clandestina* L. Sp. Pl. ed. 2, 36 (1762). *S. verbenaca* L. var. *clandestina* Hal. Consp. Fl. Gr. ii. 490 (1902).

Kilia, common and abundant on dry open hillsides, 19–22.4.23, *Ingoldby* 35; Suvla and Anzac, 16.5.24, *Kett* 113.

Distr. Nearly as for the species as a whole.

S. virgata *Ait.* Hort. Kew. i. 39 (1789).

Eski Keui, 3.6.23, *Ingoldby* 281; Angadere, coral-pink and white-flowered plants, 1.7.23, *Ingoldby* 352, 353, 354.

Distr. X. and XIVa. 1, 2, 2a, 3, 3b, 4, 6a, 7, 8, 8a, 10, 11.

S. viridis *L.* Sp. Pl. 24 (1753).

Kilia, in flower and fruit, 24.5.23, *Ingoldby* 226; Helles, 23.5.23, *Ingoldby* 270; flowered at Kew, May and June 1923.

from fruits collected in Gallipoli Peninsula by Lt.-Col. Durham, 1922. The flowers failed to set seed at Kew.
Distr. VI. and XIV.a. 1, 2, 2a, 4a, 6, 6a, 7, 14.

Satureia thymbra *L.* Sp. Pl. 567 (1753).
Helles, 28.5.23, *Ingoldby* 272.
Distr. X. and Sardinia. 1, 2, 2a, 4a, 6b.

Sideritis remota *d' Urv.* Mém. Soc. Linn. Par. i. 322 (1822).
Near Gaba Tepe, close to the beach, 10.6.23, *Ingoldby* 319.
Distr. X. 2, 6a, 7.

In the plants of this species from peninsular Greece, preserved at Kew, the spinulose-mucronate calyx-teeth are stiffer, stouter, and straighter than in the Oriental specimens. A specimen from Vodena, Macedonia, collected by Adamović is the same as the Oriental plants, as is also the one from Gallipoli quoted above.

Stachys orientalis *Vahl.* Symb. ii. 64 (1791). ?L. Sp. Pl. 582 (1753).
Angadere, up to 2 feet in height, on dry flat hill-tops, 150 m., very sweet smelling, 21.7.23, *Ingoldby* 421.
Distr. X. 2, 7, 8, 8a, 11, 14, 15.

Stachys sp.
Kilia, 24.5.23, *Ingoldby* 225.

The specimens may possibly be placed under *S. italica* sensu Hal. Consp. Fl. Gr. ii. 518 (1902) et auct. plur. sed vix Mill. Gard. Dict. ed. 8 (1768). They come close to the material at Kew and the British Museum (Natural History) under Fl. Ital. Exsicc. 1945, named *S. italica* forma *Janiana* Ces. Pass. et Gib., but they are not identical with it.

Stachys sp.
Anzac, 16.5.23, *Kett* 13.

This specimen is also morphologically related to *S. italica* auct., but is not identical with *Ingoldby* 225.

Teucrium chamaedrys *L.* Sp. Pl. 565 (1753).
Near Gaba Tepe, 10.6.23, *Ingoldby* 302; Angadere, 1.7.23, *Ingoldby* 361; Angadere, in open oak scrub, 27.7.23, *Ingoldby* 488.

Distr. III. 2, 2a, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 8, 8a, 9, 10, 11, 12, 13, 14, 15, 16.

T. divaricatum *Sieb.* Remarq. 5 (1821) nomen nudum; Hal. Consp. Fl. Gr. ii. 474 (1902).
Anzac, 16.5.23, *Kett* 11; Maidos, 14.7.23, *Ingoldby* 378.
Distr. X. 1, 2, 2a, 3a, 6b, 7.

T. polium *L.* Sp. Pl. 566 (1753).
Walker's Ridge, Anzac, 90 m., 4.5.23, *Kett* 35; Anzac, 22.5.23, *Kett* 42; Angadere, Quarry Hill, 250 m., 15.7.23, *Ingoldby* 381.

Distr. V. 1, 2, 2a, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 7, 7a, 8, 8a, 8b, 9, 10, 11, 12, 13, 14, 15, 16.

T. scordioides *Schreb.* Plant. Verticill. Unilab. 37 (1774).
Angadere, 24.7.23, *Ingoldby* 468.
Distr. V. 1, 2, 2a, 3, 3b, 4, 5, 6, 6a, 7, 7a, 8, 8a, 10, 11, 13, 14, 16.

Thymbra spicata *L.* Sp. Pl. 569 (1753).
Near Gaba Tepe, close to the beach, 10.6.23, *Ingoldby* 321.
Distr. XI. 1, 2, 2a, 7.

Thymus zygioides *Griseb.* Spic. Fl. Rumel. ii. 118 (1844).
Kilia, low spreading habit, in flower, 19–22.4.23, *Ingoldby* 53.
Distr. XIX. 6, 6a, 7, 8, 8a, 8b, 9, 10.

Our plant agrees with a specimen at Kew collected by Grisebach in Thrace. In the original description the corollas are described as "albida." So far as I can judge from dried material this is incorrect. Degen in Mag. Bot. Lap. xix. 15, 1920 (1922), has shown that *T. glaucus* Friv. is a species distinct from *T. zygioides* Griseb., though the two species had been united by Velenovsky.

Ziziphora capitata *L.* Sp. Pl. 21 (1753).
Kilia, 24.5.23, *Ingoldby* 223.
Distr. V. 2, 3, 3b, 4, 6, 6a, 6b, 7, 8, 8a, 10.

(*To be continued.*)

XL.—FURTHER NOTES ON OURATEA.

L. A. M. Riley.

Since the publication of my Revision of the Mexican and Central American species of *Ouratea** some additional material collected in Panama has been received from Dr. N. L. Britton. This includes specimens of a new species related to *O. Wrightii* (Van Tiegh.), from which it differs *inter alia* in the stipitate drupes. Another specimen extends the known distribution of *O. pyramidalis* Riley southwards to Panama. This species was previously recorded only from Tabasco and Guatemala. An additional species from Mexico is also described. The numbers which precede the species are those used in my Revision.

6. **Ouratea pyramidalis** *Riley* in Kew Bull. 1924, 107.
Panama. *Sutton Hayes* 506 (coll. 1859–60).

The Panama plant has a much longer panicle (18 cm.) than those from Tabasco and Guatemala, but cannot be separated specifically on the present material.

6A. **Ouratea madrensis** *Riley*, sp. nov. affinis *O. pyramidali* Riley, foliis oblongis supra medium tantum dentatis, paniculis longioribus cylindricis nec pyramidalibus, pedicellis usque ad 1·3 cm. longis recedit.

Frutex 2–3 m. altus. *Ramuli* graciles, 1·5 mm. diametro infra folium supremum, glabri, fusco-cinerascentes. *Folia* oblonga,

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* *Kew Bull.* 1924, p. 101.

7–14 cm. longa, 2·5–5 cm. lata, breviter acuminata, basi cuneata vel subrotundata, superne argute et laxe dentata, coriacea, supra nitida, subtus opaca vel nitidula tantum, costa et nervis utrinque satis manifestis; petioli incrassati, 3–5 mm. longi; stipulae delapsae. *Panicula* semel ramosa, cylindrica, gracilis, perlaxa, ad 15 cm. longa; pedunculi inferiores 6–7 mm. longi, 2–3-flori, superiores 2–3 mm. longi, 1–2-flori; pedicelii 0·8–1·3 cm. longi. *Alabastra* (in sicco) ovoidea, 7·5 mm. longa, 3·5 mm. diametro, subacuta. *Flores* ex alabastro descripti. *Sepala exteriora* ovato-lanceolata, 8 mm. longa, 3·5 mm. lata, subacuta, basi truncata vel subrotundata; sepala interiora ovata, 8 mm. longa, 4 mm. lata, marginibus hyalinis 1·75 mm. latis inclusis, apiculata, in basin truncatam rotundata. *Petala* obovata 1 cm. longa, 0·6 cm. lata, apice subrotunda, in basin truncatam 1·25 mm. latam gradatim angustata. *Antherae* obclavatae, 5·5 mm. longae, transverse rugosae, puniceae. *Ovaria* 5, ellipsoidea, 1·5 mm. longa, 1 mm. diametro, gynophoro 1 mm. alto insidentia; stylus 5 mm. longus. *Fructum* non vidi.

MEXICO. Guerrero: Sierra Madre, 500 m., fl. Feb., *Langlassé* 838 (type in Herb. Kew.).

I have placed this species with *O. pyramidalis* and *O. Jurgensenii* on account of the long pedicels and lax, graceful inflorescences. From these, however, it is readily distinguished by the cylindrical once-branched inflorescences and the leaf-margins being laxly dentate in the upper half only, characters which might suggest an affinity with *O. guatemalensis* or *O. Peckii.*

9. **O. isthmica** *Riley* l. c. 108.
PANAMA. *Sutton Hayes* 466 (coll. 1859–60).

12A. **Ouratea podocarpa** *Sprague et Riley*, sp. nov. ex affinitate *O. Wrightii* (Van Tiegh.), a qua foliis brevioribus obovato-oblongis vel elliptico-oblongis, inflorescentiis minus condensatis rhachi minus corrugata, pedicellis gracilioribus, carpophoro obovoideo, drupis stipitatis oblongo-ellipsoideis recedit.

Frutex 3 m. altus, caule 2–2·5 cm. diametro. *Ramuli* satis graciles, 1·5–1·75 mm. diametro infra folium supremum, fulvo-cinerascentes. *Folia* obovato-oblonga vel elliptico-oblonga, 9–14 cm. longa, 3–5 cm. lata, acuminata vel caudato-acuminata, basi obtusa, superne acute sed inconspicue serrata quadrante infimo integro, coriacea, utrinque opaca, subtus paullo pallidiora, costa nervisque ascendentibus utrinque manifestis; petioli 4–6 mm. longi, serius incrassati; stipulae e basi lata subulatae, 7 mm. longae. *Panicula* semel ramosa tantum, vel pedunculis inferioribus iterum ramosis, satis laxa, circiter 7 cm. longa, 2 cm. diametro; pedunculi superiores 1–3-flori, inferiores usque ad 7-flori; pedicelli rugosuli, ei florum 5–5·5 mm. longi, fructuum 8 mm. longi; bracteae caducae. *Alabastra* desunt. *Sepala exteriora* ovato-lanceolata, 8 mm. longa, 3 mm. lata, apice obtusa, basi subrotundata, marginibus paullo pallidioribus; sepala

interiora oblonga, 8·5 mm. longa, 3 mm. lata, marginibus hyalinis 1–1·3 mm. latis inclusis, apice mucronata, basi rotundata. *Petala* obovata, 1 cm. longa, 0.6 cm. lata, apice rotundata, in basin emarginatam quasi in unguem angustata. *Antherae* 10, obclavatae, 6·5–7 mm. longae, transverse rugosae. *Ovaria* 5, ellipsoidea, 1·5 mm. longa, 0·75 mm. diametro, gynophoro 0·75 mm. alto insidentia; stylus 6·5 mm. longus, flexuosus, rubidus, apice pallidior. *Drupae* 1–2, rubrae, oblongo-ellipsoideae, crasse stipitatae, stipite vix 2 mm. longo incluso 1–1·1 cm. longae, 5·5 mm. diametro, longitudinaliter rugosulae, superne quasi reticulatae, carpophoro obovoideo 6 mm. longo et 5 mm. diametro insidentes.

PANAMA. Penonome, fl. and fr. Feb.-March, *R. S. Williams* 223 (type); Bismarck, above Penonome, *R. S. Williams* 546.

XLI.—MISCELLANEOUS NOTES.

The following appointments have been made by the Secretary of State for the Colonies:—

Mr. R. H. SLAUGHTON-HARRIS, B.Sc., Mycologist, Rubber Research, Ceylon.

Mr. B. I. SLAUGHTER, B.Sc., and Mr. D. S. DAVIS, B.Sc., Assistant Agricultural officers, Mr. G. W. NYE, B.Sc., Cotton Botanist, Mr. W. S. MARTIN, M.Sc., Ph.D., Agricultural Chemist, Uganda.

Mr. G. de F. ROSS, Superintendent of Plantations, Cameroons.

Mr. F. R. IRVINE, Agriculturist, Achimota Secondary School, Gold Coast.

Mr. D. C. EDWARDS, B.Sc., Agricultural Instructor, Njala College, Sierra Leone.

Mr. J. D. BROWN, Superintendent, Agricultural Department, Nigeria.

Mr. C. H. KNOWLES.—We learn that Mr. C. H. Knowles (*K.B.* 1921, p.171), Senior Superintendent of Agriculture, has been appointed Deputy Director of Agriculture, Gold Coast.

Althenia in South Africa.—The genus *Althenia* F. Petit was hitherto recorded only from France, Portugal, Spain, Italy and North Africa. Ascherson and Graebner have united it with the genus *Lepilaena* Drumm. which occurs in Australia and Tasmania, but it is perhaps best kept separate. In October, 1923, I received from Mr. F. H. Holland specimens of *Ruppia maritima* L., subsp. *spiralis* (L.) Aschers. et Graebn., which in South Africa was previously recorded only from the neighbourhood of Capetown. It was collected in the lower reaches of the Chatty River near Redhouse (close to Port Elizabeth), which are often flooded with sea-water at high tides. Amongst the specimens of *Ruppia* I recognised some small scraps of an *Althenia* and at my request Mr. Holland very kindly collected a fairly large number of complete specimens. These resemble *A. filiformis* F. Petit and may have to be placed as a variety under this species, but unfortunately, although I have had female flowers in all stages and fruits with ripe seeds and well developed embryos I have failed to find any trace of male flowers, and since *Lepilaena* is distinguished from *Althenia* chiefly by the structure of the anthers a final decision as to the name which the South African plant should bear is better left over until stamens have been discovered. I think it advisable, however, to put its occurrence on record and to place it provisionally with the typical Althenias. I may add that my plant cannot be identical with *Zannichellia Aschersoniana* Graebner, which I have not seen, and which is placed by Graebner in a section by itself, *Pseudo-Althenia*, and is described and figured by him in "Pflanzenreich" iv. ii. p. 157. It was found by Wolley-Dod in South-West Cape Colony.

S. SCHONLAND.

The Andaman Islands.*—In his Forest Flora of the Andaman Islands Mr. Parkinson aims at providing foresters with a small book enabling them to find out the names of the forest products of the district. For this purpose some fifty pages at the beginning of the work are devoted to keys. These keys are in such simple, untechnical language that even those untrained in botany can use them. First there is a key to main groups such as "Trees, climbers," etc. Then each group is taken separately and divided by easy characters such as "Leaves simple, leaves trifoliate, leaves pinnate," etc. In this way the reader arrives at two numbers, one referring to the description of the species, the second to the page on which it is described. After these keys follow descriptions of the 516 woody plants to be found in the islands, arranged in botanical sequence and consecutively numbered. The common names used locally are an assistance to identification and an alphabetical index of them is appended as well as an index of the botanical names. A series of six pages of drawings, chiefly of fruits, is also included.

S. T. D.

The Imperial Forestry Institute, Oxford.—The proposal to establish an Imperial Forestry Institute, which has been under consideration for some time, is dealt with in the following communication.

"The present year will see the beginning of what should prove to be a great development in Forestry training and research, with the establishment at Oxford of an Institute which will be known as the Imperial Forestry Institute, a title adopted at the command of His Majesty the King.

"The question of establishing a central training institution was first discussed by the British Empire Forestry Conference in 1920. This Conference felt that, owing to lack of funds and dissipation of effort, training in the higher branches of forestry for the needs of the Empire was nowhere as complete or efficient as was desirable. and therefore recommended the establishment in the United Kingdom of one institution which should undertake the higher training of forest officers and should also be a centre for research into the formation. tending. and protection of forests. An impartial Committee, consisting partly of representatives of Government departments concerned and partly of experts, was thereupon appointed to make recommendations regarding the location and organization of such an institution and other matters. After visiting the Universities of Oxford, Cambridge, Bangor and Edinburgh, and also taking evidence from other Universities, as well as from Institutions and Societies interested in Forestry, this Committee issued in 1921 a report which recommended the establishment at Oxford of a central institution for the higher training of forest officers, for training in research, for the provision of special and 'refresher' courses for officers already serving, and for the conduct of research into forest production. The report made it clear that there was no intention of interfering with the work done by the various University Schools of Forestry, and provided the training of these was maintained at a required standard selected students from any such schools would be eligible for admission to the central institution. Full details will be found in the report of the Inter-departmental Committee on Imperial Forestry Education, 1921 (Command Paper 1166).

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* A Forest Flora of the Andaman Islands, C. E. Parkinson. Simla. 1923. Rs. 12.8.

"Further action was suspended until 1923, when the proposals of the Inter-departmental Committee were considered by the British Empire Forestry Conference in Canada. The Conference supported them in the strongest terms, and they were subsequently endorsed by the Imperial Economic Conference held in London the same year. Arrangements have accordingly been completed for starting the Institute in October 1924.

"The Imperial Forestry Institute will be a University Institute, the Professor of Forestry being its Director. It will be under the control of the Board of Governors representing the University and Government Departments concerned, under the Chairmanship of Lord Clinton, a Forestry Commissioner. The educational work of the Institute will comprise (1) post-graduate training of probationers for the forest services and of other qualified persons, (2) training of research officers in special subjects, and (3) provision of courses for selected officers already serving. It is intended that the Institute should maintain close touch with and be of assistance to the various forestry training centres throughout the Empire. Thus, in the case of overseas training centres which have no direct means of giving practical instruction in the latest systems of management as practised on the continent of Europe, it will be one of the functions of the Institute to arrange for such practical instruction to be given by members of its own staff to students who have already completed their general course of training at their own Universities or Colleges.

"If in any particular case it cannot undertake to give direct instruction, the Institute may arrange that this should be given at some other place. It is proposed, for instance, that close touch should be maintained with the Royal Botanic Gardens, Kew, whose unrivalled resources should be of great assistance to those students who may wish to study systematic botany and economic products. Again, forest engineering is a subject which cannot be dealt with comprehensively in Great Britain, owing to the absence of logging operations on a large scale; arrangements will therefore be made as far as possible to study it practically in the forest regions of the Continent, or in certain cases in Canada. Similarly, the study of tropical silviculture from the practical point of view is impossible outside the tropics, and hence the Institute will maintain close touch with other institutions where this subject can be efficiently dealt with, such as the Forest Research Institute and College, Dehra Dun, in order that the best possible arrangements may be made in the interests of students who wish to make a practical study of tropical silviculture.

"Although the Institute is intended primarily to serve the needs of forestry in the British Empire, it will be open to qualified students of any nationality provided that there is sufficient accommodation. Nor is it by any means intended that it should cater only for the requirements of State forest services; now that timber and wood-pulp firms are becoming more and more interested in the management and working of forests on scientific and economic lines, the Institute should be of special value in providing them with fully trained employees.

"The course of study at the Institute will normally extend over one academic year, beginning October, and will be made sufficiently elastic to serve the needs of individual students. The subjects dealt with will cover the whole range of Forestry, and will include Silviculture (European and Tropical), Forest Management (including Mensuration, Valuation, and working plans), Forest Botany (including physiology and anatomy of trees, mycology and pathology, ecology, and systematic botany), Forest Zoology (including entomology), Forest Utilization (including the structure, properties and uses of wood), Soils, Climatology, Forest Economics and Policy, Forest Law, and Forest Engineering including Surveying.

"Temporary accommodation for the Institute has been arranged, but a more suitable site and larger buildings will be necessary, and the formidable task of obtaining funds for the acquisition of a site and the erection of buildings remains. A building fund is being started, and it is hoped that this great undertaking will not suffer from lack of support on the part of benefactors who have at heart the welfare of the Empire in general and the cause of Forestry in particular."

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ROYAL BOTANIC GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

No. 10] [1924

XLII.—ON THE FLORA OF THE GALLIPOLI PENINSULA.*

W. B. TURRILL.

ILLECEBRACEAE.

Herniaria incana *Lamk.* Encycl. iii. 124 (1789).

Anzac, 22.5.23, *Kett* 44; near Gaba Tepe, close to the beach, 10.6.23, *Ingoldby* 317.

Distr. V. and XII. 2, 2a, 3, 3a, 3b, 4, 5, 6, 6a, 7, 7a, 8, 8a, 9, 10, 11, 12, 13, 14, 15, 16.

Paronychia macrosepala *Boiss.* Diagn. Ser. I. iii. 11 (1843).

Near Gaba Tepe, close to the beach, 10.6.23, *Ingoldby* 312.

Distr. VI. 1, 2, 2a.

CHENOPODIACEAE.

Atriplex portulacoides *L.* Sp. Pl. 1053 (1753).

Suvla, on the sand dunes, 5.8.23, *Ingoldby* 541.

Distr. II. 1, 2, 2a, 3, 4a, 5, 6a, 6b, 7, 8a, 11, 14, 15, 16.

Salicornia fruticosa *L.* Sp. Pl. ed. 2, 5 (1762).

Suvla, salt marsh, 8.6.23, *Ingoldby* 291.

Distr. I. 1, 2, 2a, 3, 4, 4a, 5, 6a, 7, 13, 14, 16.

Salsola kali *L.* Sp. Pl. 222 (1753) var. **glabra** *Detharding* Consp. Pl. Megalop. 25 (1828).

Near Gaba Tepe, close to the beach, 10.6.23, *Ingoldby* 314.

Distr. (of species) III. 1, 2, 2a, 3, 4, 4a, 6, 6a, 7, 8, 8a, 9, 10, 11, 13, 14, 15, 16.

S. kali *L.* var. **hirsuta** *Hornem.* Oec. Plant. ed. 3, i. 293 (1821) non vidi; C. E. Salmon in Moss, Cambr. Brit. Flora ii. 185 (1914).

Near Gaba Tepe, close to the beach, 10.6.23, *Ingoldby* 318.

Distr. Throughout the distributional area of the species as a whole.

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* Continued from *K.B.* 1924, p. 363.

(18204.) Wt. 152—28. 1000. 11/24. Wy. & S., Ltd. **Gp. 50.** (4.)

POLYGONACEAE.

Polygonum maritimum *L.* Sp. Pl. 361 (1753).

Near Gaba Tepe, close to the beach, 10.6.23, *Ingoldby* 313; Kara Kova Dere, on the beach, 30.7.23, *Ingoldby* 509.

Distr. I. 1, 2, 2a, 3, 4, 4a, 5, 6a, 7, 8, 8a, 9, 11, 14, 16.

P. tenuiflorum *Presl* in Delic. Prag. 67 (1822) non vidi.

Kara Kova Dere, on stream bank in the shade, 30.7.23, *Ingoldby* 527.

Distr. VI. 9.

The above name has been given to this plant with some hesitation. The original description is not available at Kew, but that given by Lojacono, Flora Sicula ii. 2, 303 (1907), agrees well with our specimen, but it is not very full. Boissier, in Flor. Or. iv. 1030 (1879), reduces the species to *P. lapathifolium* with the remark "forma spicis tenuioribus." In Ascherson and Graebner's Synopsis iv. 817 (1913) it is suggested with a question mark that this species is *P. nodosum* Pers. var. *laxum* (Reichb.), which it is further suggested may be a hybrid between *P. nodosum* and *P. hydropiper*. Our plant has more slender spikes than those shown in Reichenbach's figure in Ic. Pl. Crit. v. t. cccxcii. (1827). In Fiori e Paoletti, Fl. Anal. d'Ital. i. 294 (1898) the species is reduced to *P. lapathifolium* α *typicum* e *tenuiflorum*.

A specimen from Bunarbaschi, ad ripas Scamandri fl., collected by P. Sintenis, Nr. 1037, 12.9.1883, and determined as *P. nodosum* by Ascherson, is at Kew and agrees very closely with the specimen from the Gallipoli Peninsula, except in the absence of blotches on the leaves and dots on the stem, these being present in the latter. *P. tenuiflorum* has been recorded also from the Danube Delta, between Roșu and Caraorman (on Plav), by Miss Pallis in Journ. Linn. Soc. xliii. 280 (1916). A specimen from south of Sulina, collected by Miss Pallis, is at Kew, and agrees closely with our plant.

Rumex acetosella *L.* Sp. Pl. 338 (1753).

Kilia, 24.4.24, *Durham* 20.

Distr. I. 1, 2, 2a, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 6b, 7, 8, 8a, 8b, 9, 10, 10a, 11, 12, 13, 14, 15, 16.

R. acetosella *L.* var. **multifidus** *DC.* in Lamk. et DC. Fl. Franc. ed. iii. 378 (1805). *R. multifidus* L. Sp. Pl. ed. 2, 482 (1762).

Near Gaba Tepe, close to the beach, 10.6.23, *Ingoldby* 322.

Distr. Often with or replacing other varieties, especially in the Mediterranean Region.

R. tuberosus *L.* Sp. Pl. ed. 2, 481 (1762).

Suvla, 24.4.24, *Durham* 87.

Distr. V. 1, 2, 2a, 3, 3a, 6a, 7, 9, 14.

THYMELAEACEAE.

Thymelaea tartonraira *All.* Fl. Pedem. i. 133 (1785). *Daphne tartonraira* L. Sp. Pl. 356 (1753).

Kilia, abundant on dry open hillsides, 19–22.4.23, *Ingoldby* 36 : a common low growing shrub in the western parts of the Peninsula, 24.4.24, *Durham* 72.
Distr. VI. 2, 2a, 7.

ELAEAGNACEAE.

Elaeagnus angustifolia *L.* Sp. Pl. 121 (1753).

Anzac, 25 to 30 feet in height, in flower May 1923, *Kett* 17, common throughout the Pensinsula, especially in waddies ; Eski Keui, 3.6.23, *Ingoldby* 284 ; Kara Kova Dere, Aug. 1923, *Ingoldby* 563 ; Suvla and Anzac, 16.5.24, *Kett* 153.
Distr. III. 2, 2a, 4a, 6, 6a, 7, 8, 9, 14, 15.

SANTALACEAE.

Osyris alba *L.* Sp. Pl. 1022 (1753).

Sari Bahr, 27–28.5.23, *Ingoldby* 235 ; Angadere, grows to 4 or 5 feet in height, in flower and fruit, 24.7.23, *Ingoldby* 464 ; Suvla and Anzac, 16.5.24, *Kett* 89, 123.
Distr. VI. 1, 2, 2a, 3, 4, 4a, 5, 6a, 6b, 7, 8a, 11, 13, 14, 15, 16.

Thesium Bergeri *Zuccar.* Pl. Nov. in Abh. Akad. Muench. ii. 324 (1837).

Kilia, inconspicuous yellowish flowers, 24.4.24, *Durham* 102.
Distr. X. 1, 2, 2a, 4, 6.

EUPHORBIACEAE.

Euphorbia aleppica *L.* Sp. Pl. 458 (1753).

Boghali, 30.6.23, *Ingoldby* 394.
Distr. XI. but west to Italy. 2, 2a, 3, 6, 6a, 7, 8a, 14.

E. biglandulosa *Desf.* Choix Pl. 88, t. 67 (1808).

Kilia, 18.7.23, *Ingoldby* 454.
Distr. X. 1, 2, 7.

E. chamaesyce *L.* Sp. Pl. 455 (1753).

Kilia, 30 m., rocky ground, in flower and fruit, 22.5.23, *Kett* 56 ; Kilia, 8.7.23, *Ingoldby* 404 ; Angadere, on the beach, 28–29.7.23, *Ingoldby* 499.
Distr. V. and XIV. 1, 2, 2a, 3, 4, 5, 6a, 7, 8, 8a, 9, 10, 11, 13, 14, 15, 16.

E. falcata *L.* Sp. Pl. 456 (1753) var. ?

Angadere, on dry flat hill-tops, 150 m., 21.7.23, *Ingoldby* 423.
Distr. V. and XII. 1, 2, 2a, 3, 3b, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10, 11, 12, 13, 14, 15, 16.

This plant does not belong to the common variety of the species. The mucro of the inflorescence leaves is very short. I am not sure of any varietal name for it, but plants named var. *galilaea* Boiss. in the Kew Herbarium approach it very closely. Boissier in Flor. Or. iv. 1111 (1879), however, describes the seeds as having " sulci abbreviati ad foveolas reducti," while the seeds in our plants have the furrows fully developed. The specimens are attacked by *Melampsora Euphorbiae* Cast.

E. glareosa *Pall.* ex M. B. Fl. Taur.-Cauc. i. 373 (1808).
Maidos, 14.7.23; *Ingoldby* 371.
Distr. XIII., XIV. and XIVa. 6, 7, 8, 8a, 9, 10.

E. paralias *L.* Sp. Pl. 458 (1753).
Kara Kova Dere, salt marsh, 30.7.23, *Ingoldby* 524.
Distr. VI. 1, 2, 2a, 4a, 5, 6a, 7, 9, 14, 15, 16.

E. peplis *L.* Sp. Pl. 455 (1753).
Angadere, on the beach, 29.7.23, *Ingoldby* 494.
Distr. VI. and W. Europe. 1, 2, 2a, 3, 5, 6a, 7, 8, 8a, 9, 14, 15, 16.

E. Seguierana *Neckr.* in Act. Akad. Theod. Pal. ii. 493 (1770).
E. Gerardiana Jacq. Fl. Austr. v. 17, t. 436 (1778).
Suvla and Anzac, 16.5.24, *Kett* 139.
Distr. III. 2, 3b, 4, 5, 6, 6a, 7, 8, 9, 10, 11, 16.

PLATANACEAE.

Platanus orientalis *L.* Sp. Pl. 999 (1753).
Kilia, in fruit, Nov. 1922, *Kett* 72.
Distr. XI. 1, 2, 2a, 3, 5, 6, 6a, 7, 8a, 8b..

CUPULIFERAE.

Quercus aegilops *L.* Sp. Pl. 996 (1753.)
Eski Keui, top of Kilia valley, Aug. 1923, *Ingoldby* 569; near Kilia, *Ingoldby* 570, 571; Suvla, in flower, 24.4.24, *Durham* 44.
Distr. XI. 1, 2, 2a, 4, 5, 7, 11.

Q. aegilops *L.* var. **macrolepis** *Boiss.* Fl. Or. iv. 1171 (1879).
Q. macrolepis Kty. Eich. t. 16 (1859).
Suvla, with ripe fruit 20.10.22, *Kett* 64, a nicely shaped tree, with well-developed stem about 20 feet in height; Yalova, very young fruits, 8.7.23, *Ingoldby* 412; Kilia, Aug. 1923, *Ingoldby* 568.
Distr. Here and there with other varieties.

The cups are used for tanning by the Turks.

The distinguishing feature of this variety is the recurved cupular scales, but I doubt if the character is of much taxonomic value.

Q. coccifera *L.* Sp. Pl. 995 (1753).
Anzac, Aug. 1923, *Ingoldby* 571; Angadere, Aug. 1923, *Ingoldby* 572; common throughout the Peninsula, 6 to 12 feet in height, *Kett* 1, 2.
Distr. VI. 1, 2, 2a, 3a, 4, 4a, 5, 6, 6a, 6b, 7, 7a, 8b, 11, 14, 16.

There is a considerable range of expression of the characters shown by the specimens included in this species from South-East Europe. The various attempts to divide or subdivide the species have not been markedly successful, and until considerable and extensive field-work has been carried out on it further taxonomic suggestions had best remain unpublished.

Q. pedunculiflora *C. Koch* in Linnaea xxii. 324 (1849).
Near Angadere, not far from the sea, *Ingoldby* 567.
Distr. XIX. and to Caucasus. 2, 3, 3a, 3b, 4a, 5, 7.

SALICACEAE.

Salix alba *L.* Sp. Pl. 1021 (1753).
Suvla and Anzac, 16.5.24, *Kett* 114.
Distr. II. 1, 2, 2a, 3, 3b, 4, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10, 11, 12, 13, 14, 15, 16.

ORCHIDACEAE.

Anacamptis pyramidalis *Rich.* in Mém. Mus. Par. iv. 55 (1818), var. **brachystachys** *Boiss.* Fl. Or. v. 57 (1884). *Orchis brachystachys* d'Urv. in Mém. Soc. Linn. Par. i. 377 (1822).
Kilia, on dry hills, 4.5.23, *Ingoldby* 139.
Distr. (of var.) X. 1, 2, 2a, 3b, 7, 14.

Cephalanthera alba *Simk.* Enum. Fl. Trans. 504 (1886). *Epipactis alba* Cr. Stirp. Austr. vi. 460 (1769).
Kilia, in patches, growing best in the protection of fairly thick low scrub on dry hills, 4.5.23, *Ingoldby* 138 ; Kilia, 24.4.24, *Durham.*
Distr. VI. and XII. 2, 3b, 4, 5, 6a, 8, 8b, 9, 10, 11, 12, 13, 14, 15, 16.

C. cucullata *Boiss. et Heldr.* Diagn. Ser. I. xiii. 12 (1853).
Near Anzac, 180 m., rare, 25.4.23, *Ingoldby* 167 ; Suvla and Anzac, 16.5.24, *Kett* 94.
Distr. XI. 1.

C. longifolia *Fritsch* in Oesterr. Bot. Zeitschr. xxxviii. 81 (1888). *Serapias longifolia* Huds. Fl. Angl. 341 (1762). *Cephalanthera ensifolia* Rich. in Mém. Mus. Par. iv. 60 (1818).
Kilia, 19–22.4.23, *Ingoldby* 57 ; western slopes of Achi Baba, 23–24.4.23, *Ingoldby* 87.
Distr. III. 2, 3, 6, 6a, 7, 8, 8b, 10, 11, 12, 13, 14, 15, 16.

Helleborine atropurpurea *Schinz et Thell.* in Mitt. Bot. Mus. Zürich xliv. 588 (1909). *Epipactis atropurpurea* Rafin. Car. 87 (1810). *E. atrorubens* Schult. Österr. Flor. ed. 2, i. 58 (1814).
Angadere, 120 m., 24.7.23, *Ingoldby* 466 ; Kara Kova Dere, 30 m., 30.7.23, *Ingoldby* 526.
Distr. V., XII. and XVIII. 2, 5, 6a, 8b, 10, 11, 12, 13, 16.

Ophrys cornuta *Stev.* in M. B. Fl. Taur.-Cauc. ii. 370 (1808), *Ophrys oestrifera* M. B. var. *cornuta* Boiss. Fl. Or. v. 80 (1884).
Anzac, common, 25.4.23, *Ingoldby* 114 ; in flower at Kew, 22.5.24, tubers sent from Gallipoli Peninsula by *Lt.-Col. A. C. H. Gray.*
Distr. XIX. 1, 2, 2a, 4, 4a, 6, 6a, 7, 8, 8a, 10, 11. 12, 13, 14, 16.

O. fusca *Link* in Schrad. Journ. ii. 324 (1799).
Angadere, common, growing best in moist shady localities, early April, *Ingoldby* 3.
Distr. V. 1, 2, 2a, 4a, 5, 6a, 7, 11, 14, 16.

O. fusca *Link* var. **iricolor** *Reichb.* Ic. xiii. 74 (1851). *O. iricolor* Desf. Choix Pl. 6, t. 3 (1808).

Tubers sent from Gallipoli Peninsula by *Lt.-Col. A. C. H. Gray*, in flower at Kew, 22.5.24.

Distr. Here and there throughout the distributional area of the species.

O. lutea *Cav.* Ic. et Descript. ii. 46, t. 160 (1793).

Suvla, the earliest orchid to flower, middle of March, *Ingoldby* 4; and a living specimen in flower at Kensington, 25.4.24, from a tuber brought home from Gallipoli Peninsula.

Distr. VI. 1, 2, 2a, 4a, 6a, 7, 14.

O. mammosa *Desf.* Choix Pl. 5, t. 2 (1808).

Boghali, early April, *Ingoldby* 1; Helles, 23.4.24, *Durham* 5; tubers sent from Gallipoli Peninsula by *Lt.-Col. A. C. H. Gray*, in flower at Kew, 22.5.24.

Distr. VI. 1, 2, 2a, 3, 4a, 6a, 7, 8, 14, 16.

O. oestrifera *M. B.* Fl. Taur.-Cauc. ii. 369 (1808). *O. scolopax* Ch. et B. Fl. Pelop. 62, t. 34, f. 7, vix Cav. Ic. et Descript. ii. 46, t. 161 (1793).

Kilia, common on dry hillsides where it grows best in the protection of low scrub, middle of April, *Ingoldby* 31; tubers sent from Gallipoli Peninsula by *Lt.-Col. A. C. H. Gray*, in flower at Kew, 22.5.24.

Distr. XI. 2, 7.

O. speculum *Link.* in Schrad. Journ. ii. 324 (1799).

Helles, local, 23–24.4.23, *Ingoldby* 86.

Distr. V. 1, 2, 7.

O. tenthredinifera *Willd.* Sp. Pl. iv. 67 (1805).

Helles, local, 23–24.4.23, *Ingoldby* 81.

Distr. VI. 1, 2, 2a, 14.

Orchis coriophora *L.* Sp. Pl. 940 (1753) var. **fragrans** *Boiss.* Voy. Bot. Esp. ii. 593 (1845). *O. fragrans* Poll. Elem. Bot. ii. 155 (1811) non vidi; Hal. Consp. Fl. Gr. iii. 168 (1904).

Suvla, 27–28.5.23, *Ingoldby* 239; tubers sent from Gallipoli Peninsula by *Lt.-Col. A. C. H. Gray*, in flower at Kew, 7.7.24.

Distr. (of species) V. and XII. 2, 3b, 4a, 5, 6a, 7, 8, 8a, 8b, 9, 10, 11, 12, 13, 14, 15, 16.

One of the specimens has flowers with relatively short lips, whose lobes are paler than normally and with broad streaks of dull green, while the spurs only just attain the length of the labella. The Vanilla–like odour is very faint.

O. morio *L.* Sp. Pl. 940 (1753).

Helles, 23–24.4.23, *Ingoldby* 88.

Distr. III. 2, 2a, 3b, 4a, 5, 6, 6a, 7, 8, 8a, 9, 10, 10a, 11, 12, 13, 14, 15, 16.

O. morio *L.* var., or hybrid with this species for one of the parents.

Angadere Bijich Yakajik Tepe, local, 29.4.23, *Ingoldby* 122.

The flowers are decidedly larger and the lip of a somewhat different shape from that of common *O. morio*, but the specimen is certainly to be included within the same group.

O. morio *L.* var. **picta** *Reichb.* Ic. xiii. 17, t. 13 (1851). *O. picta* Lois. Fl. Gall. ed. 2, ii. 263 (1828).

Suvla, 24.4.24, *Durham* 42.

Distr. (of var.) VI. 2, 2a, 3, 3b, 4a, 5, 6, 6a, 7, 8a, 10, 12, 13, 14, 16.

O. sepulchralis *Boiss. et Heldr.* Diagn. Ser. I. xiii. 10 (1873). *O. punctulata* Stev. in Lindl. Orch. 273 (1835) β *sepulchralis* Reichb. Ic. Fl. Germ. xiii.–xiv. 27 (1851).

Suvla, yellow flowers, 23.4.24, *Durham* 31.

Distr. X. 7.

O. simia *Lamk.* Fl. Fr. iii. 507 (1778).

Angadere, only found among scrub, early April, *Ingoldby* 2; tubers sent from Gallipoli Peninsula by *Lt.-Col. A. C. H. Gray*, in flower at Kew, 22.5.24.

Distr. IV. and XI. 1, 2, 6a, 7, 8, 8a, 9, 10, 11, 12, 13, 14, 16.

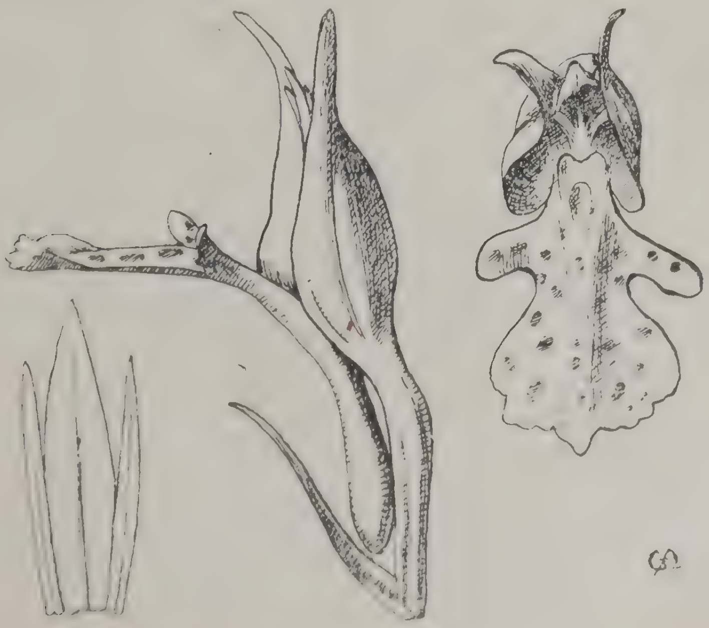
O. tridentata *Scop.* Fl. Carn. ed. 2, ii. 190 (1772).

Helles, 23–24.4.23, *Ingoldby* 85; Suvla, 24.4.24, *Durham* 37.

Distr. VI., XII. and XVIII. 1, 2, 4a, 6, 6a, 7, 8, 8a, 9, 10, 11, 12, 13, 14, 15, 16.

O. tridentata *Scop.* var. **chersonesensis** *Turrill* var. nov.; floribus parvis, labelli lobo medio apiculato, lobis lateralibus angustis haud spatulatis, truncatis vel dentatis.

Tubers sent from Gallipoli Peninsula by *Lt.-Col. A. C. H. Gray*, in flower at Kew 22.5.24.



IRIDACEAE.

Crocus aureus *S. et S.* Prodr. i. 24 (1806); Fl. Gr. t. 35 (1806).
Kilia, in scrub, early April, *Ingoldby* 16; Helles, Feb. 1924, *Kett* 136.
Distr. XIX. and to Hungary and Asia Minor. 6, 6a, 6b, 7, 8, 8a, 9, 10.

C. sativus *L.* Sp. Pl. 36 (1753) var. **Pallasii** *G. Maw* in Gard. Chron. New Ser. xvi. 430 (1881). *C. Pallasii* M.B. Fl. Taur.-Cauc. iii. 35 (1819).
Anzac, Suvla and Helles, in flower from Oct. to Dec. 1922, *Kett* 67.
Distr. (of var.) XIX. to lower Italy and Crimea. 7, 8, 8a, 8b, 9, 13, 14.

Gladiolus segetum *Ker-Gawl* in Bot. Mag. t. 719 (1804).
Maidos, cliff face, 18.5.23, *Ingoldby* 206; corms from Gallipoli Peninsula, cultivated by Lt.-Col. Durham and in flower in his garden at Kew, 5.5.24.
Distr. V. 1, 2, 2a, 4, 4a, 6a, 7, 8a, 11, 12, 13, 14, 15, 16.

Iris mellita *Janka* in Mag. Tud. Akad. Math. Termész. Közl. xii. 172 (1874), non vidi, et in Termész. Fñz. I. iv. (1877).
Suvla, flowers dark purple, Nov. 1922, *Kett* 68; Angadere, early April 1923, *Ingoldby* 21; Suvla, yellow- and blue-flowered plants, *Durham* 68; rhizomes sent from Gallipoli Peninsula by Capt. Ingoldby, in flower at Kew, June 1924.
Distr. XIX. 6, 6a, 7, 8, 8a, 8b.

I. sisyrinchium *L.* Sp. Pl. 40 (1753).
Angadere, early April 1923, *Ingoldby* 22; Kilia, sky blue flowers with white blotches on the falls, 24.4.24, *Durham* 98.
Distr. V. 1, 2, 2a, 4a.

Romulea Linaresii *Parl.* Fl. Panorm. i. 38 (1839) et Fl. Ital. iii. 246 (1858).
Anzac, common, in flower, 7.3.23, *Kett* 58; Kilia, early March, *Ingoldby* 7, and fruiting specimens early April and 15.5.23.
Distr. VI. and Abyssinia. 1, 2, 2a, 3, 6a, 7.

AMARYLLIDACEAE.

Pancratium maritimum *L.* Sp. Pl. 291 (1753).
Kara Kova Dere, salt-marsh, 30.7.23, *Ingoldby* 523; Suvla, sand dunes, 5.8.23, *Ingoldby* 539; in fruit, without locality, *Ingoldby*.
Distr. V. 1, 2, 2a, 3, 5, 6, 6b, 7, 8a, 14.

DIOSCOREACEAE.

Tamus communis *L.* Sp. Pl. 1028 (1753) var. **creticum** *Boiss.* Fl. Or. v. 344 (1884). *T. cretica* L. Sp. Pl. 1028 (1753).
Kilia, 4.5.23, *Ingoldby* 150.

Distr. (of species) IV. and V. 1, 2, 2a, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 7, 8, 8a, 10, 11, 12, 13, 14, 15, 16.

LILIACEAE.

Allium atroviolaceum *Boiss.* Diagn. Ser. I. vii. 112 (1846) et Fl. Or. v. 240 (1884).

Near Gaba Tepe, in a gorge with thick vegetation and where the ground was fairly moist, *Ingoldby* 306; Maidos, 14.7.23, *Ingoldby* 376.
Dist. XI. 6a, 8a.

A. margaritaceum *S. et S.* Prodr. i. 224 (1806) et Fl. Gr. t. 315 (1823).

Angadere, in open oak scrub, 27.7.23, *Ingoldby* 481.
Distr. V. 2, 2a, 3, 4, 4a, 5, 6, 6a, 6b, 7, 8, 8a, 8b, 9, 10, 11, 13, 14.

A. paniculatum *L.* Syst. Pl. ed. 10, 978 (1759) et Sp. Pl. ed. 2, 428 (1762) var. **pallens** *Gren. et Godr.* Fl. France iii. 209 (1856); Boiss. Fl. Or. v. 260 (1884). *A. pallens* L. Sp. Pl. ed. 2, 427 (1762).

Angadere, 22–24.7.23, *Ingoldby* 451.
Distr. (of species) III. 2, 2a, 3, 3b, 4a, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10, 11, 12, 13, 14, 15, 16.

The Linnean *A. pallens* is retained by Halácsy, Consp. Fl. Gr. iii. 256 (1904), as a species, and all the Greek plants he quotes are placed under the variety *Coppoleri* (Tin.) Parl. Our plant comes very near to specimens from Greece and from Sicily, but has very short spathes. The solitary specimen is insufficient for deciding whether or not there is a distinct geographical race in the Gallipoli Peninsula.

A. pulchellum *G. Don* in Mem. Wern. Soc. vi. 46 (1827).

Gaba Tepe, on the beach, 10.6.23, *Ingoldby* 307; Angadere, in fruit, 22–24.7.23, *Ingoldby* 444.
Distr. V. and XIVa. 3, 6, 6a, 8a, 8b, 10, 11, 12, 13, 14, 15, 16.

A. rotundum *L.* Sp. Pl. ed. 2, 423 (1762).

Helles, in flower, 14.5.23, *Kett* 62; Suvla and Anzac, 16.5.24, *Kett* 102, a plant with small pinkish-green flowers, apparently not normally developed.
Distr. V. and XIII. 1, 2, 2a, 3, 6, 6a, 6b, 7, 7a, 8, 8a, 9, 10, 13, 14, 16.

Asparagus acutifolius *L.* Sp. Pl. 314 (1753).

Angadere, 1.7.23, *Ingoldby* 355.
Distr. VI. 1, 2, 2a, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 7, 7a, 8, 8a, 11, 13, 14, 15, 16.

A. aphyllus *L.* Sp. Pl. 314 (1753).
Distr. VI. 1, 2, 2a, 6a.

Colchicum bulbocodioides *M. B.* Fl. Taur.-Cauc. i. 293 (1808), *C. montanum* Boiss. Fl. Or. v. 164 (1884) pro parte, non L. Sp. Pl. 342 (1753).

Suvla and Helles, Feb. 1924, *Kett* 130, 135.

Distr. VI. and XIII. 2, 8, 8a, 8b, 9.

Fritillaria pontica *Wahl.* in Isis xix. 984, non vidi. et in Berggr. Resor ii. Bihang 27 (1826); Bot Mag. t. 8865 (1920).

Kilia, rare, early April 1923, *Ingoldby* 8.

Distr. X. 6, 6a, 6b, 7, 8, 8a, 8b.

Gagea peduncularis *Pasch.* in Beib. Bot. Centrlbl. xx. ii. 76, 105 (1906).

Kilia, on flat ground, common and abundant, late March 1923, *Ingoldby* 13; Suvla, Feb. 1924, *Kett* 127.

Distr. VI. 1, 2, 2a, 3, 6a, 7, 8a, 14.

The pedicels of the above plants are not so long as generally in this species.

Hyacinthus ciliatus *Cyr.* Pl. Rar. Neap. ii. 23, t. 10 (1788). non vidi. *Bellevalia ciliata* Nees Gen. iv. t. 8 (1843).

Bulb collected at Azmak, Angadere valley, in flower 17.4.24 in the garden of Major W. M. J. Martin, Warminster; Kilia, 24.4.24, *Durham* 12.

Distr. V. 2, 6a.

Muscari comosum *Mill.* Gard. Dict. ed. 8 (1768).

Kilia, common on dry hillsides, 2–3.4.23, *Ingoldby* 133; between Sogaule Dere and Jam Baz Dere, 8–11.5.23, *Ingoldby* 189.

Distr. V. 1, 2, 2a, 3, 4, 5, 6, 6a, 7, 8, 8a, 8b, 9, 10, 10a, 11, 12, 13, 14, 15, 16.

M. neglectum *Guss.* in Ten. Fl. Neap. Syll. app. v. 13 (1831).

Bulb collected at Azmak, Angadere valley, in flower 10.4.24 in the garden of Major W. M. J. Martin, Warminster.

Distr. VI. 2, 3, 4, 6, 6a, 7, 8a, 10, 11, 12, 13, 14, 15, 16.

Ornithogalum fimbriatum *Willd.* in Ges. Naturf. Fr. Neue. Schr. iii. 420 (1801), non vidi; Hal. Consp. Fl. Gr. iii. 235 (1904).

Kilia, common and abundant, early April 1923, *Ingoldby* 17a.

Distr. X. 2, 6a, 7, 8.

O. narbonense *L.* Amoen. Acad. iv. 312 (1759).

Anzac, rare, in very hard ground, 27–28.5.23, *Ingoldby* 241; Suvla and Anzac, 16.5.24, *Kett* 103.

Distr. VI. 1, 2, 2a, 3, 3b, 6a, 7, 8, 8a, 10, 11, 12, 13, 14, 15, 16.

The plant named *O. pyrenaicum* L. (*Durham* 32, 1922) in the Kew Bulletin 1922, 298, I now consider is *O. narbonense* L., with the flowers in a young condition, but I confess that I cannot always separate *O. narbonense* from *O. pyrenaicum* when only dried specimens are available.

O. nutans *L.* Sp. Pl. 308 (1753).
Helles. local. 23–24.4.23, *Ingoldby* 97; Kilia, 24.4.24, *Durham* 19.
Distr. XI. 1, 2, 3b, 6, 6a, 6b, 8b, 9, 10.

O. umbellatum *L.* Sp. Pl. 307 (1753).
Kilia, local, early April. *Ingoldby* 17b; Suvla, 24.4.24, *Durham* 55.
Distr. IV. and VI. 1, 2, 2a, 4a, 6, 6a, 7, 8, 9. 10, 11, 12, 13, 15, 16.

Ruscus aculeatus *L.* Sp. Pl. 1041 (1753).
Anzac, common, to 2 feet in height, in fruit Nov. 1922, *Kett* 78.
Distr. IV. and XI. 1, 2, 2a, 3, 4, 5, 6, 6a, 7, 7a, 8, 8a, 9, 10, 11, 12, 13, 14, 15, 16.

Tulipa Hageri *Heldr.* in Gartenfl. xxiii. 97, t. 790 (1874).
Helles, on flat ground above the Lancashire Landing, 23–24.4.23, *Ingoldby* 100, 100a; Helles, 20.4.24, *Durham* 1, 4; Suvla and Anzac, 16.5.24, *Kett* 154.
Distr. XX. 2.

Mr. Dykes tells me that many forms of *T. Hageri* are to be found in Greece. It is doubtful if colour has much taxonomic value in this species.

T. praecox *Ten.* Fl. Nap. i. 170, t. 32 (1811–1815).
Helles, 16.5.23, *Kett* 6.
Distr. VI. (2), 15.

TYPHACEAE.

Typha angustata *Bory et Chaub.* Nouv. Fl. Pelop. 4 (1838).
Near Anzac, Aug. 1923, *Ingoldby* 590.
Distr. X. 1, 2, 2a, 3, 4, 4a, 5, 6a, 7, 9, 14.

JUNCACEAE.

Juncus acutus *L.* Sp. Pl. 325 (1753) var. **Heldreichianus** *Heldr.* Chlor. Thera 23, non vidi; Hal. Consp. Fl. Gr. iii. 280 (1904).
Near Anzac, Aug. 1923, *Ingoldby* 592.
Distr. (of species) I. 1, 2, 2a, 4a, 5, 6, 6a, 7, 8, 11, 13, 14, 15, 16.

ARACEAE.

Dracunculus vulgaris *Schott* Melet. i. 17 (1832) non vidi. *Arum dracunculus* L. Sp. Pl. 964 (1753).
Angadere, in fruit, Aug. 1923, *Ingoldby* 586.
Distr. V. 1, 2, 2a, 3, 4a, 6, 6a, 6b, 7, 11, 14, 15, 16.

CYPERACEAE.

Carex divisa *Huds.* Fl. Angl. 348 (1762).
Suvla, 24.4.24, *Durham* 81.
Distr. IV. and V. and S. Africa. 1, 2, 2a, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 7, 8, 8a, 10, 11, 13, 14, 15, 16.

C. flacca *Schreb.* Spic. Fl. Lips. Appendix, last page but one, nr. 669 (1771) var. **cuspidata** *Turrill* comb. nov. *C. glauca* var. *cuspidata* Aschers. et Gr. Synops. ii. 2, 138 (1902).
Kilia, 24.4.24, *Durham* 10.
Distr. (of var.) V. 1, 2, 4a, 6a, 7, 12, 14, 15, 16.

Cyperus longus *L.* Sp. Pl. 45 (1753).
Near Anzac, Aug. 1923, *Ingoldby* 594.
Distr. IV. and V. 1, 2, 3, 3b, 4, 4a, 5, 6, 6a, 6b, 7, 8, 8a, 10, 11, 12, 13, 14, 15, 16.

C. rotundus *L.* Sp. Pl. 45 (1753).
Helles, in flower, 16.5.23, *Kett* 57.
Distr. I. 1, 2, 2a, 3, 4, 4a, 5, 6a, 7, 8a, 10, 11, 14.

Scirpus holoschoenus *L.* Sp. Pl. 49 (1753).
Near Anzac, Aug. 1923, *Ingoldby* 591.
Distr. III. and S. Africa. 1, 2, 2a, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 7, 8, 8a, 9, 10, 11, 12, 13, 14, 15, 16.

S. Tabernaemontani *Gmel.* Flor. Badens. i. 101 (1806).
Near Anzac, Aug. 1923, *Ingoldby* 593; Kilia, grows to 5 or 6 feet in height, 24.4.24, *Durham* 23.
Distr. III. 2, 3, 4a, 6, 8, 8a, 9, 10, 11, 12, 13, 14, 16.

GRAMINEAE.

Aegilops ovata *L.* Sp. Pl. 1050 (1753) var. **triaristata** *Cos. et Dur.* Expl. Alg. ii. 211 (1856). *A. triaristata* Willd. Sp. Pl. iv. 943 (1805).
Suvla and Anzac, 16.5.24, *Kett* 96, 115, 128.
Distr. (of species) V. 1, 2, 2a, 3, 4, 4a, 5, 6, 6a, 7, 7a.

Agropyrum elongatum *P. de Beauv.* Agrost. 146 (1812). *Triticum elongatum* Host. Gram. Austr. ii. 18, t. 23 (1802).
Near Anzac, Aug. 1923, *Ingoldby* 600.
Distr. V. 1, 2, 2a, 3, 6a, 7, 8, 8a, 9, 14, 15, 16.

Agrostis verticillata *Vill.* Prosp. Fl. Dauph. 16, non vidi, et Hist. Pl. Dauph. ii. 74 (1787).
Near Anzac, Aug. 1923, *Ingoldby* 599.
Distr. V. 1, 2, 2a, 4a, 6a, 6b, 7, 8, 8a, 11, 14, 16.

Aira capillaris *Host.* Gram. Austr. iv. 20, t. 35 (1809).
Kilia, 24.4.24, *Durham* 21.
Distr. V. 1, 2, 2a, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 6b, 7, 8, 8a, 8b, 10, 11, 12, 13, 14, 15, 16.

Anthoxanthum odoratum *L.* Sp. Pl. 28 (1753).
Suvla, 24.4.24, *Durham* 76.
Distr. III. 1, 2, 2a, 3, 3a, 5, 6, 6a, 7, 8, 8a, 8b, 10, 10a, 11, 12, 13, 14, 15, 16.

Avena sterilis *L.* Sp. Pl. ed. 2, 118 (1762).
Suvla and Anzac, 16.5.24, *Kett* 101.
Distr. V. 1, 2, 2a, 3, 4, 4a, 7, 13, 14, 15, 16.

Bromus hordeaceus *L.* Sp. Pl. 77 (1753) var. **molliformis** *Hal.* Consp. iii. 396 (1904).
Kilia, 25.4.24, *Durham* 117.
Distr. (of species) III. 1, 2, 2a, 3, 3b, 4, 4a, 5, 6, 6a, 6b, 7, 8, 8a, 8b, 9. 10, 11, 12, 13, 14, 15, 16.

I am not satisfied that the plants of the Eastern Mediterranean Basin are the same as the Western European *B. molliformis* Lloyd.

B. madritensis *L.* Amoen. Acad. iv. 265 (1759).
Suvla and Anzac, 16.5.24, *Kett* 147.
Distr. V. 1, 2, 2a, 3, 4, 4a, 6a, 7, 11, 13, 14, 15, 16.

B. scoparius *L.* Amoen. Acad. iv. 266 (1759).
Suvla, 24.4.24, *Durham* 80.
Distr. V. 1, 2, 2a, 3, 3b, 4, 4a, 6, 6a, 7, 8a, 10, 16.

B. tectorum *L.* Sp. Pl. 77 (1753).
Suvla, 24.4.24, *Durham* 78; Suvla and Anzac, 16.5.24, *Kett* 98.
Distr. V. and XII. 1. 2, 2a, 3, 3b, 4, 4a, 6, 6a, 7, 8, 8a, 9, 10, 12, 14, 15, 16.

Catapodium loliaceum *Link* Hort. Berol. i. 45 (1827). *Poa loliacea* Huds. Fl. Angl. ed. 3, 43 (1798).
Kilia, 23–24.4.23, *Ingoldby* 108b.
Distr. V. and W. Europe. 1, 2, 4a, 7, 11, 13, 14, 15, 16.

Cynodon dactylon *Pers.* Syn. i. 85 (1805). *Panicum dactylon* L. Sp. Pl. 58 (1753).

Very common in the western parts of the Peninsula, in fruit, Nov. 1922, *Kett* 84; Kilia, June or July 1923, *Ingoldby* 581a.
Distr. I. 1, 2, 2a, 3. 4. 4a. 5. 6, 6a, 7, 8, 8a, 9, 10, 11, 12, 13, 14, 15, 16.

Dactylis glomerata *L.* Sp. Pl. 71 (1753), var.
Near Anzac, Aug. 1923, *Ingoldby* 597; Kilia, 24.4.24, *Durham* 15; Suvla and Anzac, 16.5.24, *Kett* 106.
Distr. (of species) II. 1, 2. 2a, 3, 3a, 3b, 4. 4a, 5, 6, 6a, 6b, 7, 7a, 8, 8a, 8b, 9, 10, 10a, 11, 12, 13, 14, 15, 16.

Ingoldby's specimen is a plant with the spikelets crowded together and with the glumes having lines of long hairs on the backs and margins. The other specimens are young but probably belong to the same race or variety.

Erianthus Hostii *Griseb.* Spic. Fl. Rumel. ii. 548 (1845).
Near Anzac, Aug. 1923, *Ingoldby* 601.
Distr. XIX. 3, 5, 6a, 7, 8, 8a, 9, 10, 11, 14.

Hordeum murinum *L.* Sp. Pl. 85 (1753).
Suvla and Anzac, 16.5.24, *Kett* 100, 111, 129.
Distr. II. 1, 2, 2a, 3, 4, 4a, 5, 6, 6a, 7, 8, 8a, 9, 10, 11, 12, 13, 14, 15, 16.

This grass is being used in parts of the British Cemeteries on the Gallipoli Peninsula for stabilizing the sand.

H. murinum *L.* var. **leporinum** *Chaub. et Bory* Flor. Pelop. 8 (1838). *H. leporinum* Link in Linnaea ix. 133 (1835).
Suvla, 23–24.4.24, *Durham* 84.
Distr. (of var.) V. 1, 2, 2a, 3, 5, 6a, 7, 8, 8a, 10, 11, 13, 14, 15, 16.

Imperata cylindrica *P. de Beauv.* Agrost. 165 (1812). *Lagurus cylindricus* L. Syst. ed. 10, 878 (1759).
Near Anzac, Aug. 1923, *Ingoldby* 596.
Distr. I. 1, 2, 2a, 3, 4, 4a, 5, 6a, 7, 11, 14, 15, 16.

Lagurus ovatus *L.* Sp. Pl. 81 (1753).
Helles, 24.5.23, *Kett* 48 ; Helles, 24.4.24, *Durham* 48.
Distr. VI. 1, 2, 2a, 3, 4, 4a, 5, 6a, 7, 7a, 11, 12, 13, 14, 15, 16.

Lolium rigidum *Gaud.* Agrost. Helv. i. 334 (1811).
Suvla and Anzac, 16.5.24, *Kett* 95.
Distr. V. 1, 2, 2a, 3, 5, 6, 6a, 7, 8a, 14, 15.

Phleum graecum *Boiss. et Heldr.* Diagn. Ser. I. xiii. 42 (1853).
Suvla and Anzac, 16.5.24, *Kett* 99.
Distr. X. 1, 2, 2a, 6, 6a, 7, 8a, 10, 11.

P. subulatum *Aschers. et Graebn.* Synops. ii. i. 154 (1899) *Phalaris subulata* Savi Fl. Pis. i. 57 (1798).
Kilia, June or July, 1923, *Ingoldby* 581b.
Distr. V. and XVIII. 1, 2, 2a, 3, 4, 4a, 5, 6, 6a, 7, 8a, 11, 13, 14, 15, 16.

Phragmites communis *Trin.* Fund. Agrost. 134 (1820). *Arundo phragmites* L. Sp. Pl. 81 (1753).
Near Anzac, Aug. 1923, *Ingoldby* 598.
Distr. I. 1, 2, 2a, 3, 4, 5, 6, 6a, 7, 8, 8a, 9, 10, 11, 12, 13, 14, 15, 16.

Poa bulbosa *L.* Sp. Pl. 70 (1753) var. **vivipara** *Koeler* Descr. Gram. 189 (1802) non vidi ; Aschers. u. Graebn. Synops. ii. i. 392 (1900).
Kilia, 23–24.4.24, *Durham* 22 ; Suvla, 24.4.24, *Durham* 39
Distr. (of species) II. 1, 2, 2a, 3, 3a, 3b, 4, 4a, 5, 6, 6a, 6b, 7, 8, 8a, 8b, 9, 10, 12, 13, 14, 15, 16.

P. bulbosa *L.* var ?
Suvla, 24.4.24, *Durham* 33.

P. trivialis *L.* Sp. Pl. 67 (1753) ? viviparous.
Anzac, 22.4.24, *Durham* 6.
Distr. (of species). III. 1, 2, 2a, 3b, 4, 4a, 5, 6a, 7, 8, 8a, 8b, 9. 10, 11, 12, 14, 15.

Sorghum halepense *Pers.* Synops. i. 101 (1805). *Holcus halepensis* L. Sp. Pl. 1047 (1753).
Near Anzac, Aug. 1923, *Ingoldby* 595; Suvla and Anzac, 16.5.24, *Kett* 90.
Distr. I. 1, 2, 2a, 3, 4, 4a, 5, 6, 6a, 7, 8, 8a, 9, 10, 11, 12, 13. 14, 15, 16.

Vulpia ciliata *Link* Hort. Berol. i. 147 (1827). *Festuca ciliata* Danth. in Lamk. et DC. Fl. Fr. iii. 55 (1805).
Kilia, 23–24.4.23, *Ingoldby* 108a.
Distr. V. 1, 2, 2a, 3, 3a, 4, 5, 6, 6a, 7, 8, 8a, 10, 11, 12, 14, 16.

CONIFERAE.

Juniperus oxycedrus *L.* Sp. Pl. 1038 (1753).
Kilia, Aug. 1923, *Ingoldby* 566.
Distr. VI. 1, 2, 2a, 3, 3a, 3b, 4, 5, 6, 6a, 6b, 7, 7a, 8a, 8b, 10, 11, 13, 14, 15, 16.

Pinus halepensis *Mill.* Gard. Dict. ed. 8 (1768).
Near Boghali, *Ingoldby* 564; Kara Kova Dere, *Ingoldby* 564a; on Quarry Hill, near Angadere, *Ingoldby* 565; all Aug. 1923.
Distr. VI. 1, 2, 2a, 5, 7, 11, 13, 14.

FILICES.

Adiantum capillus-veneris *L.* Sp. Pl. 1096 (1753).
Near Suan Dere, found growing on the rocks of the waterfall, Nov. 1922, *Kett* 70.
Distr. I.

XLIII.—DECADES KEWENSES

PLANTARUM NOVARUM IN HERBARIO HORTI REGII CONSERVATORUM.

DECAS CX.

1091. **Draba obscura** *Dunn* [Cruciferae-Alyssineae]; a *D. gracillima* Hook. f. & Thoms. foliis ovatis petiolatis in caule distantibus floribus albis distincta.

Herba annua, prostrata, laxa, 8–12 cm. longa, glabra. *Caulis* paullo ramosa. *Folia* caulina sparsa; lamina ovata, apice basique obtusa vel basi angustata, 5 mm. longa, petiolo aequalis. *Flores* (*fide* R. R. Stewart) albi, axillares, solitarii, in racemum 4–5 cm. longum collecti; pedicelli graciles, 0·5

1 cm. longi. *Siliquae* ascendentes, pedicellatae, lineares, 1-2 cm. longae, stylo 2 mm. longo terminatae: valvae planae, membranaceae, longitudinaliter venosae; septum evanidum vel 0; replum persistens. *Semina* 6–10, biseriata; cotyledones accumbentes.

N.W. India. Kashmir; Sonamarg, usually inconspicuous in damp grassy places at 3000–3500 m., Sept. 1917, *R. R. & I. D. Stewart* 3547.

1092. **Astragalus Isabellae** *Dunn* [Leguminosae-Galegeae-Astragaleae]; a *A. coluteocarpo* Boiss. stipulis magnis distincta.

Frutex ad 2 m. altus, ramosus, mox omnino glaber; rami annotini laeves, erecti, crassi, floribus fructuque ornati. *Folia* pinnata, linearia, 20–30 cm. longa; stipulae liberae, late ovatae, 1·5–2 cm. longae, apice bifurcatae, basi primo breviter vaginantes, mox omnino fissae; petioli breves; foliola 17–21, ovato-oblonga, apice basique obtusa, 3–5 cm. longa, 1–1·3 cm. lata, subsessilia. *Racemi* axillares densiflori, 5 cm. longi, fructu elongati; pedunculi eis aequilongi. *Flores* subsessiles, luteoli vel purpurascentes, 2 cm. longi. *Calyx* tubulosus, membranaceus, 7 mm. longus; dentes 5, 3 mm. longi, pilis nigris paucis ornati. *Petala* calycis tubo duplo longiora; vexillum lanceolato-ovatum in unguem angustatum; alae et carinae petala paullo breviores, longe falcatae. *Ovarium* lineare, 5-ovulatum, in stylum glabrum et gynophorum angustatum. *Legumen* lanceolatum, turgidum, 2–3 cm. omnino longum, in rostrum et carpophorum longum angustatum, sutura seminale intrusa in loculos 2 divisum. *Semina* reniformia.

N.W. India. Kashmir; Goorai at 3000 m. 20 July, 1876, *C. B. Clarke*; Pahgam at 3300 m. 9 Aug. and 6 Sept. 1920, *R. R. Stewart* and *Isabel D. Stewart* 5972; Sonamarg at 3100 m. 27 July 1922, *R. R. Stewart* 7201.

1093. **Cotoneaster humilis** *Dunn* [Rosaceae-Pomeae]; a *C. acuminata* Lindl. habitu prostrato, foliis et drupis minoribus distincta.

Frutex deciduus, parvus, prostratus. *Caules* breves, robusti, ramosi, superne appresse hirsuti; cortex rubescens, tandem rugosus, griseus. *Folia* ovata, apice acuta mucronata basi obtusa, 2–3 cm. longa, chartacea, supra glabra, subtus ut pedicelli dentesque calycis laxe lanata; petioli 3–5 mm. longi; stipulae lineares. *Flores* axillares, solitarii vel brevissime racemosi, 5 mm. diam. *Calycis* tubus intra lanatus, 3 mm. longus; lobi 1 cm. longi, mucronati, conniventes. *Petala* spathulata, 2 mm. longa, patula. *Stamina* numerosa. *Drupa* globosa, rubra, 5 mm. diam., 3–4-pyrena.

N.W. India. Kashmir; Sonamarg on rocks at 4000 m. 9 Aug. 1921 *R. R. & I. D. Stewart*.

1094. **Pimpinella kashmirica** *R. R. Stewart ex Dunn* [Umbelliferae-Ammineae]; a *P. Saxifraga* L. foliis triangularibus bipinnatis distincta.

Herba perennis, 30–40 cm. alta, pauciramosa, omnino glabra. *Caulis* striatus. *Folia* radicalia 2–3–pinnata, ambitu triangularia, ad 20 cm. longa, basi late breviter vaginata; laciniae ovatae, apice acutae, 2–3 cm. longae, dentibus lanceolatis, mucronatis; petiolus laminae aequalis. *Umbellae* 1–2, longe pedunculatae; involucri bracteae O; umbellulae 8–10, radiis 3–4 cm. longis, bracteolis O. *Flores* albi, 4 mm. diam, *Carpella* tereti-5–gona, oblonga, 3mm. longa, stylis reflexis arcte coronata; juga primaria 5, aequalia; vittae plures, tenues.

N.W. India. Kashmir; Sonamarg at 3–4000 m. July 1921. *R. R. Stewart* 6267; Aug. 1921. *R. R. Stewart* 6331; 25 July 1922, *R. R. Stewart*, 7222: Baltal, Scinde Valley at 3–4000 m. 3 Sept. 1922, *R. R. Stewart.*

1095. **Pituranthos Stewartii** *Dunn* [Umbelliferae-Ammineae]; a *P. Thomsoni* C. B. Clarke fructu 1–2 mm. longo, foliorum laciniis acutis distincta.

Herba perennis, ramosa, late et rigide extendens, 1 m. lata et alta, omnino minute puberula. *Radix* cylindricus. *Caulis* striatus. *Folia* pauca, praecipue infera; radicalia 6–12 cm. longa, bipinnata: segmenta in laciniis lanceolatis acutis irregulariter divisa; petiolus lamina longior; lateralia minora, similia: stipulae obscurae. *Umbellae* parvae, numerosae, 2–3 cm. diam., graciliter pedunculatae; radii 5–6, bracteis brevibus linearibus suffulti. *Umbellulae* similiter constructae. *Flores* 2 mm. diam. *Petala* alba, incurva. *Fructus* ovatus, a latere compressus, 2 mm. longus et latus, pilis brevibus dense hirsutus, stylis brevibus reflexis coronatus; carpella teretia, sub-5–gona; vittae in valliculis solitariae.

N.W. India. Frontier Provinces; Hazara and Punjab. Shapur on dry clay and gravel soils at 4–5000 m. *J. F. Duthie* 7482; *J. R. Drummond* 14411, 14623, 14486, 15070, 15071; *R. R. Stewart* 4109, 5102, 5250, 7508.

1096. **Campanula tenuissima** *Dunn* [Campanulaceae-Campanuleae]; a *C. argyrotricha* Wall. foliis lanceolatis, capsulis basi angustatis distincta.

Herba ad 20 cm. alta, ubique pilis brevibus sparsis aculeolata. *Caules* ex radice plurimi, flexuosi, tenuissimi, breviter strigosi. *Folia* pauca, caulina, sessilia, lineari-lanceolata, apice basique angustata, repando-dentata, sparse pilosa, 1–1·5 cm. longa. *Flores* in paniculam terminalem tenuem multifloram dispositi, 8–10 mm. longi, bracteati. *Calycis* tubus 5 mm. longus, adnatus, turbinatus: limbus tubo aequalis, 5–partitus, dentibus linearibus, sinubus nudis. *Corolla* alba, campanulata, 5 mm. longa, ad dimidium in lacinias lineares 5-fida. *Ovarium* inferum, 3-loculare, placentis multiovulatis; stigma 3-fidum. *Capsula* infera, trigona, ad basin angustata, calycis lobis coronata, lateraliter inter costas valvulis basalibus dehiscens.

N.W. India. Kashmir; Jhelum Valley Road at about 800 m. 28 Aug. 1919, *R. R. Stewart* 5104.

1097. **Rochelia lissocarpa** *Dunn* [Boragineae-Borageae-Eritrichieae]; a *R. leiocarpa* Ledeb. pedicellis fructu longioribus distincta.

Herba parva, annua, gracilis superne strigosa. *Caules* filiformes, erecti, plerumque simplices, 5–8 cm. alti, breviter strigosi. *Folia* alterna, pauca, sessilia, linearia, 5–8 mm. longa, ut sepala scabro-hispida. *Flores* supra folia racemosi, ebracteati. *Sepala* 5, post anthesin incurvo-cancellata, linearia, 3–4 mm. longa. *Corollae* tubus cylindraceus, 1 mm. longus, rectus, fauce intus nuda, 5-dentatus. *Stamina* 5, brevia, tubo affixa, inclusa. *Ovarium* 2-loculare. *Stylus* brevis, inclusus, stigmate bilobo capitatus. *Nuculae* 2, 1-spermae, erectae, pyriformes, nitentes, laeves, 2–3 mm. longae, columnae fere ad apicem affixae.

N.W. INDIA. Kashmir; Purana Tilel at 3000 m. 3 July 1919, *R. R. Stewart* 4398.

1098. **Scutellaria teucriifolia** *Dunn* [Labiatae-Stachydeae]; a *S. alpina* L. foliis regulariter crenatis distincta.

Suffrutex parvus, superne ubique breviter hirsutus. *Caules* numerosi, ascendentes, 8–10 cm. alti; *Folia* ovata vel oblongo-ovata, apice basique obtusa, 1–1·5 cm. longa, ambitu toto crebre crenata; petioli inferiores dimidio laminarum aequales, superne gradatim breviores. *Flores* in spica racemosa supra folia collecti; quisque sub bractea subsessilis; bracteae sessiles, ovatae, acutae, integrae nonnunquam violascentes, conspicue nervosae, decussatim imbricatae. *Corolla* luteola, superne violacea, 2 cm. longa; tubus inferus 2–3 mm. diam. superne ampliatus.

N.W. INDIA. On dry gravelly soil in N. Punjab and W. Kashmir at 1700-2100 m., 5 May, 1895, *Harriss* 16477; July, 1908, *Toppin* 456; May 1907 *Deane*; 4 May 1921, *R. R. and I. D. Stewart* 6180.

1099. **Apama Barberi** *Gamble* [Aristolochiaceae]; *A. siliquosae* Lamk. affinis, foliorum nervis basalibus brevioribus, caeteris numerosioribus, perianthii lobis apiculatis, stylo longiore differt.

Frutex erectus ramulis nodosis cinereis lenticellis multis oblongis praeditis. *Folia* lanceolata, acuminata, basi rotundata, supra lucida, subtus cinerea et minute puberula, 5–15 cm. longa, 3–5 cm. lata; nervorum par infimum vix ad mediam partem porrectum, nervi utrinque 6–10 prominentes et prope marginem conspicue arcuati, nervuli transversi et sicut etiam reticulatio conspicui; petiolus brevissimus vix 3 mm. longus. *Flores* ex axillis foliorum in cymis brevibus vix 5 mm. longis, bracteis parvis hispidis deciduis. *Perianthium* breviter campanulatum extus hispidum, lobis 3 obovatis, subito apiculatis, circiter 4 mm. longis. *Stamina* 9, filamentis liberis brevibus, antheris aequilongis, connectivo apice producto triangulari. *Stylus* columnaris, 1–2 mm. longus, in stigmatibus 6 subulatis divisus. *Capsulae* glabrae, tetragonae, apice acuminatae, moniliformes, 3 cm. longae, sed specimina matura nondum reperta.

S. INDIA. Tinnevelly District, at Kannikatti, *Barber* 2981, 3093.

1100. **Piper Barberi** *Gamble* [Piperaceae]; species inter alias Indicas foliis pinnatim nerviis spicis masculis etiam longissime pedunculatis distinctissima.

Frutex verosimiliter scandens, ramulis teretibus glabris non multum ad nodos tumentibus. *Folia* lanceolata, longe acuminata, basi inaequaliter acuta, supra glabra, subtus minutissime punctata, marginibus subhyalinis siccitate undulatis, nervis utrinque circiter 5 curvatis et arcuatim intra marginem junctis, 10–14 cm. longa, 3–5 cm. lata; petiolus 1–1·5 cm. longus; stipulae latae, ocreatae, 1·2 cm. longae. *Spica* mascula 5–6 cm. longa, 2–3 mm. lata, pedunculo gracili 6–7 cm. longo glabro; spica faeminea ignota. *Bracteae* orbiculares, peltatae, 1 mm. diametro. *Stamina* 2, filamentis 1 mm. longis, antheris ellipticis longitudinaliter fissis. *Fructus* adhuc ignotus.

S. INDIA. Tinnevelly District, at Kannikatti, May 1901, *C. A. Barber* 2991.

XLIV.—PASSERINA: TYPE SPECIMENS.

D. THODAY.

My attention has been called by the Director to the desirability of indicating the type specimens of new species which I omitted to do in my recent revision of the genus (*Kew Bull.* 1924, p. 146). In taking this opportunity of remedying the omission I have also listed for completeness and convenience the type specimens of the other species, and have supplied references to the Latin diagnoses of *P. rubra* and *P. Galpini* which I had overlooked owing to their having been published later than Flora Capensis, v. sect. ii.

1. **Passerina montana** *Thod.* in Kew Bull. 1924, p. 152.
   Type: *J. M. Wood* 4036 (Herb. Kew), near Mooi River, 4000–5000 ft. Natal.

2. **P. glomerata** *Thunb.*
   Type: "P. glomerata *α* (Lin. Herb.)" in Herb. Thunberg, Upsala.

3. **P. pendula** *Eckl. et Zeyh. ex Thod.*, l. c. p. 155.
   Type: *Zeyher* 7381 (Herb. Kew), Zwartkops River, Uitenhage Div.

4. **P. Burchellii** *Thod.* l. c. p. 155.
   Type: *Burchell* 7761 (Herb. Kew), mountain tops of Baviaans Kloof near Genadendal, Caledon Div.

5. **P. rubra** *C. H. Wright* in Kew Bull. 1915, p. 387.
Type : *Galpin* 4492 (Herb. Kew) Muiskraal near Garcias Pass, 1200 ft., Riversdale Div.

6. **P. obtusifolia** *Thod.*, l. c. p. 157.
Type : *Rogers* 16703 (Herb. Kew), between Osplaats and Tunnel Sidings 2000–3000 ft., Worcester Div.

7. **P. falcifolia** *C. H. Wright.*
Type : *Drège* (Herb. Kew) Vanstaadesberg, stony places, 1000–2000 ft., near Uitenhage.

8. **P. comosa** *C. H. Wright.*
Type : *Drège* 2570, between Pedros Kloof and Leliefontein, 3000–4000 ft., Khamiesberg Range, Little Namaqualand.

9. **P. filiformis** *Linn.*
Type : " P. filiformis " in Herb. Linn.

10. **P. Galpini** *C. H. Wright* in Kew Bull. 1915, p. 386.
Type : *Galpin* 4491 (Herb. Kew) near Milkwoodfontein, 600 ft., Riversdale Div.

11. **P. paludosa** *Thod.*, l. c. p. 161.
Type : *Thoday* 100 (Herb. Kew. acc. anno 1922).

12. **P. vulgaris** *Thod.*, l. c. p. 162—*P. filiformis* var. *vulgaris* Meisn. in Linnaea, xiv. 399 (1840).
Type : *Drège* (Herb. Kew) Paarlberg, 1000–2000 ft. (one of the syntypes of *P. filiformis* var. *vulgaris* Meisn.).

13. **P. paleacea** *Wikstr.*
Type : " Passerina glomerata γ " in Herb. Thunberg, Upsala. (see Thoday l. c. p. 148). This synonym is quoted incorrectly as " P. glomerata α " in Thoday l. c. p. 164.

14. **P. rigida** *Wikstr.*
Type : " Passerina glomerata β " in Herb. Thunberg, Upsala (see Thoday l. c. p. 148).

15. **P. ericoides** *Linn.*
Type : " Passerina ericoides " in Herb. Linn.

Since the publication of the Revision I have seen the following additional specimens at Kew :

(1) Three specimens from Alexander Prior's herbarium recently incorporated.

P. falcifolia C. H. Wright, from Georgetown (George Div.).
P. vulgaris Thod., from Hottentots Holland (Cape Div.)
P. rigida Wikstr., from the Cape Flats (Cape Div.) with characteristic fruits and bracts.

(2) A specimen of *P. vulgaris* Thod. from the National Herbarium of Victoria, Melbourne: *J. R. Tovey* 4, Coode Island, Victoria. I am indebted to Mr. Sprague for the information that Coode Island was originally a portion of the south bank of the Yarra River and was cut off by the construction of a canal in 1886. It is chiefly used as a quarantine station for stock. Ships' ballast has been deposited on one part of it. Many aliens from South Africa and elsewhere have been recorded from the island. (Proc. Roy. Soc. Vict. xxii, p. 24, 1910; Victorian Naturalist xxviii, pp. 57–61, 1911; Proc. Roy. Soc. Vict. xxxv. p. 196. 1923, where this specimen is referred to as *Passerina filiformis*). Clearly the species is an alien, recently introduced into Victoria.

XLV.—MISCELLANEOUS NOTES.

Mr. B. T. Steemson, B.A., has been appointed by the Secretary of State for the Colonies, Assistant Superintendent of Agriculture, Gold Coast.

William Botting Hemsley.—This distinguished botanist, formerly Keeper of the Herbarium and Library of the Royal Botanic Gardens, Kew, died at Broadstairs on October 7. For some years he had been afflicted with paralysis, which had rendered him quite helpless, but his mind remained clear up to a few days before the end came, and the lively interest he felt in the welfare of his old friends and in everything that concerned his beloved Kew left him only when consciousness itself failed. His funeral took place at St. Peter's Church, Broadstairs, on October 11, and among those who attended it were Mr. A. D. Cotton and Dr. Otto Stapf, F.R.S., the present and former keepers of the Herbarium and Library. Mr. Cotton represented the Royal Botanic Gardens, Kew, and Dr. Stapf, an old and valued friend of Dr. Hemsley's, represented the Royal Society.

Dr. Hemsley was in many respects a remarkable man, and a complete account of his long and useful life and the work which, though confronted by many difficulties, he managed to accomplish, would form a large volume of important and interesting history. Here we are limited to a mere sketch of his career. Born at East Hoathly, a small village near Uckfield, Sussex, on December 29, 1843, he was apparently destined to become a gardener or nurseryman, and while still a boy obtained some experience in gardening operations under his father. Shortly before reaching the age of 17, he entered the Royal Botanic Gardens, Kew, as an Improver, having been recommended to Sir William Hooker by Mrs. Eardley Hall, daughter of Mr. William Borrer, the well-known British Botanist.

In his "Early reminiscences of Kew," published in the Journal of the Kew Guild, 1893, p. 31. Hemsley has given us a most entertaining description of his experiences in those far-away days. After spending a few months in the Gardens he was selected to do some temporary work in the Herbarium, where, as he tells us, he was placed under the kind, clever, conscientious Allan A. Black, whose promising career was so soon to be ended by death.

During the time spent in the Herbarium Hemsley gave so much satisfaction that in June, 1865, he was given a permanent appointment, succeeding Alexander Smith as Herbarium clerk. Two years later his health broke down and he was obliged to resign. This must have appeared to him then as a great calamity, but it proved instead to be a stroke of good fortune. His illness was serious and incapacitated him for a considerable time, but he at length recovered so far that he was able to return to the Herbarium as an independent worker, and it was during those years of freedom from official routine that he accomplished the work that established his reputation as a botanist, and which was duly recognised by the Royal Society by his election as a Fellow in 1889. In 1883 he rejoined the Herbarium staff as Assistant for India, then a part-time post, and in 1890 was re-admitted into the Civil Service to take up the duties of Principal Assistant. On the retirement of Mr. J. G. Baker, Hemsley was appointed Keeper of the Herbarium and Library, and filled that office with distinction from January 13, 1899 till December 28, 1908, when, having reached the age limit, he retired.

Hemsley's earliest published work appeared in the first edition (1866) of that useful compilation, Lindley and Moore's "Treasury of Botany." In the following year he communicated a paper on the "Distribution of British Umbelliferae" to the Journal of Botany. Thereafter, with a few years' intermission due to his breakdown in health, his pen must have been nearly constantly employed. In the seventies he contributed largely to horticultural journals and produced his "Handbook of hardy trees, shrubs and herbaceous plants," which was based on Decaisne and Naudin's "Manuel de l'amateur des jardins"; this was published in 1873. Between 1880 and 1890 he must have worked at high pressure. In those years he wrote the "Report on the Botanical Results of the voyage of H.M.S. Challenger," a most valuable essay on insular floras, and the botanical portion of the "Biologia Centrali-Americana," edited by F. D. Godman and O. Salvin. Hemsley's election to the Fellowship of the Royal Society was no doubt largely due to the value of this work on the Mexican flora. In 1882 the admirable Catalogue of Miss North's Paintings, which Hemsley had prepared, was first published. In 1886 was issued the first part of the "Index Florae Sinensis," which, when completed in 1905, formed three thick volumes of the Journal of the Linnean Society. The name of Mr. F. B. Forbes is associated with that of Hemsley's in the authorship of this Index, and various botanists contributed to it.

It was, however, mainly Hemsley's work. He wrote or collaborated with others in writing papers on the floras of Afghanistan, Burma and Tibet. The *Rhamnaceae*, *Campanulaceae* and a part of the *Scrophulariaceae* in the "Flora of Tropical Africa" were worked out by Hemsley. The *Kew Bulletin*, Hooker's Icones Plantarum, and the Botanical Magazine received numerous contributions from him. Sir Joseph Hooker dedicated to him the Botanical Magazine for 1898, and on the title-pages of the volumes for 1903 and 1904 Hemsley's name is associated with Sir Joseph's. A noteworthy piece of work was his paper on *Julianiaceae*, a new natural family of plants established by Hemsley, which he communicated to the Philosophical Transactions of the Royal Society, series B, vol. 199, pp. 169–197, with some excellent drawings by Miss M. Smith.

It is impossible to mention here, even by the briefest of titles, all Dr. Hemsley's many and varied achievements as an author. They may be traced in the List of Kew Publications which appeared in the *Kew Bulletin*, 1897, pp. 1–84, and 1907, appendix v. Those of the years 1906 to 1914 are enumerated in the International Catalogue of Scientific Literature. His most important publication since 1914 is a Flora of Aldabra in which he received assistance from the Kew Staff; this appeared in the *Kew Bulletin*, 1919, pp. 108–153.

Hemsley's activities were not limited to authorship. In 1872–73 he was employed at Rothamsted by Mr. (afterwards Sir) J. B. Lawes to assist in the experiments on the mixed herbage of permanent meadow. During 1875 he was Lindley Librarian to the Royal Horticultural Society, and for a session in 1876 was Lecturer on Botany at St. Mary's Hospital Medical School.

Hemsley was elected an Associate of the Linnean Society in 1873 and in 1896, at his own request, the Society accorded him transfer to Fellowship. He was also an Honorary Member of the Natural History Society of Mexico, the Royal Horticultural Society (from which he received the Victoria Medal of Honour in Horticulture in 1909), the Royal Society of New South Wales, and the New Zealand Institute; also a Corresponding Member of the German Botanical Society. In 1913 he was given the honorary degree of LL.D. of the University of Aberdeen. This distinction afforded him great pleasure. It was not his lot to be sent as a youth to a great public school and a University, and in later life he said: "I have often felt the want of a University training, which no amount of study can replace."

As we are writing not only of a distinguished scientific man and of one who was a highly esteemed public servant, but also of an old friend who had a kindly, sensitive and refined nature, we may be permitted to say a few words concerning his family, and to allude to some of his sorrows, of which he had many and grievous. His wife survives him, but the delicate state of her health was for several years a source of anxiety to him, and it became so serious that she could not be by his side at his journey's end. His only son Oliver, who, after a training at Kew and in the Royal Botanic Garden, Calcutta, was appointed Superintendent of the Government Gardens, Lahore, Punjab, and gave promise of doing remarkably well, died at the age of 30 in 1906. His only daughter, his capable and accomplished assistant in much of his later work, lost her husband, Mr. Edward H. Lovelock, after a short illness in 1914, which was a great grief to her father.

Many interesting particulars of Dr. Hemsley's life and work are given in the Journal of the Kew Guild, 1893, p. 31, and 1899, p. 1 (with portrait), the Journal of Horticulture, 1909, lviii, p. 6 (with portrait), and in the Gardeners' Chronicle, 1909, xlvi, p. 381 (with portrait). In the last mentioned is an admirable appreciation of Hemsley by Sir William Thiselton-Dyer, under whom nearly the whole of his official life was spent, from which we quote the following :—

"We have laboured together in many undertakings of which he has borne the principal burden. And, looking back on a past which must reach to some 40 years, I recognise throughout the same retiring and unpushful disposition and modest diffidence which I well remember when we first met. These pages will meet the eye of many young men. They may well take note of the career of a man, without backing, and with nothing to start with but character and love of knowledge, whose early education must have been slender, and who throughout life had to struggle with ill-health. Yet he taught himself German from a colleague, and to write French and Latin fluently, and, in the most unassuming way, but with unwearying industry and courage, attained scientific distinction, and, within the limits of his science, a reputation which is cosmopolitan."

James Britten.—We have to record with regret the death of Mr. James Britten, the well-known botanical editor, who died suddenly at London, on the 8th October, 1924. He was born at Chelsea on the 3rd May, 1846, and early became attracted to the study of plants ; he stated in a passing remark a few years ago that his use of Anne Pratt's books on the Flowering Plants and Ferns of Great Britain was "one of the pleasantest memories of his childhood," and in another passage, "one of my earliest botanical recollections is the finding of a specimen of *Aster Tripolium* by the Thames . . . . I think about 1855," that would be when he was nine years old.

His earliest botanical publication seems to have been in 1863, when a note of his, "Rare and exotic plants at Kew Bridge, Surrey" was printed in the first volume of The Journal of Botany, British and Foreign, a publication whose editor he afterwards became for the long period of nearly forty-five years. In 1865 he removed to High Wycombe, where he edited two volumes of the Quarterly Magazine of the Natural History of that town, from 1865 to 1870. In 1869 he was appointed an Assistant in the

Herbarium of the Royal Botanic Gardens, Kew, and two years later he was transferred to the Botanical Department of the British Museum, then at Bloomsbury, where Henry Trimen was the Senior Assistant, whose acquaintance he had made some years earlier at the Society of Amateur Botanists. Britten was a frequent contributor to Hardwicke's Science Gossip from its commencement until he became editor of the Journal of Botany in 1880 in succession to Trimen, who left for Ceylon to take the position left vacant by the death of G. H. K. Thwaites.

Whilst his editorial duties were evidently a source of delight to him, and made his views and proclivities known to an intimate circle, he brought out certain other issues of an independent kind. Thus his " European Ferns " came out in 4to in 1879–81 ; an edition of W. Turner's " Names of Herbes " with modern names appeared in 1881 ; " The Young Collector's Handbook of Flowering Plants " in 1883 ; a reprint from the English Dialect Society's volume of 1880, as a treatise on old farming words, chiefly taken from the agricultural books written by William Ellis, a farmer at Little Gaddesden, in Hertfordshire. He also contributed appendixes to certain works of travellers, on the floras of Timor and East Africa. In conjunction with Robert Holland, Britten brought out a " Dictionary of English Plant-names " decidedly the fullest and best work of the kind, published in three parts from 1878 to 1886. His alliance with G. S. Boulger produced the valuable " A Biographical Index of British and Irish Botanists," 1893, with three supplements bringing the work down to 1907. (A revised edition is, I believe, quite ready to go to press.)

But the personality of James Britten was best displayed in his articles and editorial comments in the Journal of Botany. For many years he had made remarks on the Kew publications, and printed such paragraphs as this :—" After a suspension of nine months, our erratic little Kew contemporary has once more sprung into active life." etc. A striking point was made when the *Kew Bulletin* had fallen some months into arrear, though the Appendixes had been duly published, the remark being made that the periodical had apparently perished from appendicitis !

Britten retired from the British Museum in 1909 on completing 40 years in the public service. He was elected a Fellow of the Linnean Society on the 21st April, 1870. B. D. J.

Macaranga from Fiji.—In the Journ. Linn. Soc., Bot. xliii. 38 (1915) I gave the name *Macaranga grandifolia* to a new species from Fiji. It was not till some time after the publication of the name and description that I found that Merrill in Philipp. Journ. Sc. Bot. 1912, VII. 394 (1913) had used the same combination for *Croton grandifolius* Blanco, transferring this to the genus *Macaranga*. Merrill's name stands, and for the Fiji plant the name **Macaranga magna** *Turrill* is here substituted for *M. grandifolia* Turrill non Merrill.

W. B. T.

Botanical Magazine.—The final part (Pt. iv) of Volume cxlix. was published on September 22nd and the volume is very fittingly dedicated by the Royal Horticultural Society "in admiration and gratitude" to the Rt. Hon. Sir Herbert Maxwell, Bt., "distinguished by knowledge and skill as a gardener and by grace and charm as a writer, a staunch friend of Horticulture and Forestry, an investigator in many fields, and withal a faithful servant of the Nation for long years."

The plants figured are *Philodendron teretipes* Sprague (t. 9013), from Colombia; *Rhododendron apodectum* Balf. f. & W. W. Smith (t. 9014), from the mountains of the Shweli–Salwin divide, Yunnan; *Dendrochilum uncatum* Reichb. f. (t. 9015), a native of the island of Luzon, Philippines; *Pieris taiwaiensis* Hayata (t. 9016), from Formosa; *Berberis morrisonensis* Hayata (t. 9017), also a native of Mount Morrison, Formosa; *Primula cardiophylla* Balf. f. & W. W. Smith (t. 9018), from Sikkim; *Corokia buddleioides* A. Cunn. (t. 9019), a native of the North Island, New Zealand; *Picea Glehnii* Masters (t. 9020), from Japan; *Viola elegantula* Schott (t. 9021), from the mountains of Bosnia to Central Albania; *Philadelphus Delavayi* L. Henry (t. 9022), from N.W. Yunnan and *Ouratea flava* Hutchinson & Dalziel (t. 9023), a shrub extending from Sierra Leone to Angola.

Tropical Plant Research Foundation.—Number 9 of the journal "Phytopathology" (1924) gives an account of the Tropical Plant Research Foundation which has recently been incorporated in the United States. The particular objects and business of the Foundation are to promote research for the advancement of knowledge of the plants and crops of the tropics; to conduct investigations in plant pathology, entomology, plant breeding, botany and forestry, horticulture and agronomy, and to publish the results thereof; and to establish and maintain such temporary or permanent stations and laboratories as may be necessary for the accomplishment of these objects, under the restrictions and regulations established in its bye-laws.

Brachystegia.—The two following corrections require to be made in "A Revision of Brachystegia" which appeared in *K.B.* 1923: Page 151, in lines 10 and 22 after *Swynnerton* 1028 add 'pro parte': Page 152, in lines 17 and 18 delete the reference to *Eyles* 813!

J. B. D.

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